



FRIDAY, DEC. 19.

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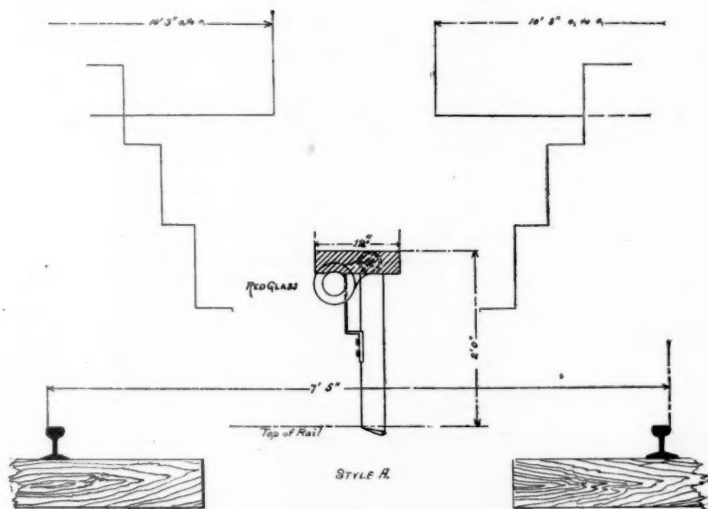
## Contributions.

## Proposed Form of Dwarf Signals.

Office of Supervisor of Signals, New York  
Division Pennsylvania Railroad,  
JERSEY CITY, N. J., Nov. 24, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Following my letter of Nov. 19, I inclose you tracing showing proposed forms of dwarf signal designed for use between tracks.



PROPOSED FORMS OF DWARF SIGNALS.

Style A requires a very slight modification of the present form of dwarf signal, as the upper part of the spectacle casting in which the red glass is fixed is simply extended a sufficient distance upward to bring it in line with the top of the signal, and is painted red, as shown by the section lining. This makes an arm 12 in. long and 3 1/4 in. wide, and can be made wider if necessary. The lamp is placed in the usual way. This seems to give ample room between the signal and the steps of passenger cars, as shown in outline. The present form of dwarf signal can easily be changed to this style.

Style B shows a design prepared by the Union Switch & Signal Co. The blade and disk are to be all rubber, and a separate casting used for holding the red glass. The principal difference in this form of signal is in the position of the lamp.

With either of these styles of dwarf signals the greater part of the objection to placing them between tracks is entirely removed, as they are very much smaller than any form of dwarf signal now in use.

HENRY M. SPERRY,  
Supervisor of Signals.

## Argentine Railroad Concessions Annulled.

COLONIA, URUGUAY, Nov. 2, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The Argentine Government has just issued a decree annulling a number of concessions for the construction of different railroads in the republic, owing to the non-compliance of the concessionaires with the conditions of their contracts, in not commencing construction within

the time specified. The indulgence of the late government had misled owners of concessions into the belief that they could hang on to the same until a favorable opportunity offered to launch or transfer them at a profit. The present decree puts an end to the following:

1. From Capilla del Señor to Giles.....	32 kilometres.
2. " Buenos Ayres to Riachuelo.....	3 1/4 "
3. " Cachari to Trenqueleu.....	455 "
4. " Zarate to Tony.....	555 "
5. " Villa Mercedes to Rosario.....	515 "
6. " Tigre to San Roque.....	682 "
7. " San Nicolas to Rufino.....	257 "
8. " Villaguay to Tucuman.....	90 "
9. " Tucuman to Resistencia.....	1,679 "
" Catamarca to Rio IV.....	
" Rio IV. to Buenos Ayres.....	
Total.....	4,248 1/4 "

A Buenos Ayres daily says:

"It is melancholy to see nine railroad concessions, extending over 4,248 kilometres, thus summarily sent to the waste basket. Calculating the cost of each kilometre at an average of \$20,000 gold, we see \$84,000,000 worth of work, capital and material vanish into the air. Had the extraordinary prosperity of the country during 1886, 1887 and 1888 continued, and the political and financial crisis been put off until 1892, the majority of these concessions would to-day be within the strict terms of the law and in course of construction. But the fates willed otherwise, more's the pity, for in the above concessions the government did not risk a dollar, and all the concessionaires had a bona fide business in hand. Had they succeeded in launching their railroad schemes the country would have received an enormous impetus, for the 4,000 kilometres of proposed lines would have employed \$84,000,000 of capital and a large army of laborers. The concessionaires deserve sympathy and the country at large may well deplore that a political and financial crisis has thwarted such legitimate and far-reaching aspirations."

The concessions having government guarantees that are annulled are few in number but individually important. They are as follows:

10. From the Parana River to Portugal.....	900 kilometres.
11. " Villa Maria to Reconquista.....	301 "
12. " Jujuy to Bolivia.....	280 "
Total.....	1,511 "

It is said that two more concessions may be regarded as practically annulled, namely: one with five per cent. guarantee on capital of \$34,805,000 gold; and another from Tingasta to the Chilian frontier, with a five per

## Guarding Against Signalmen's Mistakes.

NEW YORK, Dec. 8, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I am glad to see your editorial of Dec. 5 showing up the collision at Taunton, England, and pointing out the causes of and remedy for accidents of that kind. The roads of this country have used the block system so little and for such a comparatively short period that we are liable to forget the loopholes in the system which need to be guarded against. Everything works smoothly as long as we block only the passenger trains, whose trainmen are careful and who still continue to take the same care to protect themselves as before the block system was adopted. But we need only to watch the records of the European roads to see that even block signalmen may bring on disaster by forgetfulness. I remember two or three cases in the chapters you have published from the English Government reports, wherein a signalman has forgotten the presence of a train or engine which stood immediately under his window. Sometimes they will forget that a train is waiting for a signal and hold it there until the engineer gets mad and blows the whistle.

While I admire the simplicity of the staff system you propose for the protection of a train which is waiting on a main track, the circumstances of the Taunton collision remind me of a simple expedient for preventing it, which is suggested by long time practice with old fashioned hand switches; or rather I am reminded of the fact that in adopting new and improved methods and appliances we sometimes find, in signaling as in other affairs, that the old ways discarded are not always totally bad; that in throwing away faulty things we lose some good ones also. I refer to the practice of leaving one of the crossover switches open. Any one familiar with double track roads has seen an eastbound train set off on the westbound track, and has seen, in such cases, the switch on the north track (westbound) left set for the crossover track. This is the simplest and most natural practice—in fact, it is the best practice; for if a train were to approach from the east it would better be derailed than collide with the freight. But in consequence of the custom of operating both of the switches of a crossover by one lever and simultaneously, and of the desire of the designers of interlocking to provide against dangers which are almost wholly imaginary, this good practice has to be abandoned. The advantages of operating both the switches of a crossover by one lever are so highly regarded by signal engineers that the method is not to be lightly thrown aside; but yet we can see that if the switches were operated separately a very simple safeguard could be provided for cases like that in England by making it a rule to leave one of the switches set for the crossover. The interlocked signal protecting the freight would then necessarily remain at danger. The signal permitting the freight to move forward through the crossover could still be interlocked with the signal on the other main track, so as to provide against carelessly letting the freight back upon its own track in the way of the passenger train for which it had backed off. This idea might conflict with the plans of people who believe in scrimping the expenses for back-up signals, and substituting hand motions for them; but that is no good reason for rejecting it. Let us hear from the experts on this point.

C. O.

[We have heard from several of "the experts on this point." As we should expect, none of them agree with C. O. that it is the best, or even good, practice to work the two switches of a crossover by two independent levers and leave one of them set for the crossover while the other is set for the main track. The extra cost of the lever, frame, tower space and connections should, of course, be saved unless undoubted advantages in the way of security can be gained by the use of another lever. But it is the opinion of all signal engineers whom we have consulted that the greatest security is got by working the two ends of a crossover simultaneously with one lever. Then, when one main line signal is cleared it is physically impossible for a train to foul that track by coming off the other on the crossover. In the case of a trailing crossover, as at Taunton, and as assumed, we suppose, by C. O., this would not be likely to happen, but it might happen from several causes.

Some of our correspondents suppose that C. O. must have had in mind stub switches, as he says that it would be better that a westbound train should be derailed than collide with another which had backed through the crossover and was standing on the westbound track. With a split switch derailment would not be likely. But as we know that C. O. must have been thinking of split switches we are even more puzzled than our correspondents as to his exact idea.

This matter of guarding against such accidents as that at Taunton has long puzzled the experts of the Board of Trade and English signal engineers. An American signal engineer suggests as a cheaper method than a track circuit the use of several detector bars beyond the crossover switches, properly placed, and so interlocked that while a freight train that had backed over the crossover is standing on any of these detector bars it will be impossible to clear the signal

GEORGE H. BAKER.

for a train approaching on the track on which the freight is standing. His plan complete calls for a five-lever frame, viz.:

One lever for two crossover switches and two dwarf signals.

One lever for all detector bars in eastbound track.

One " " westbound track.

One lever for home signal for eastbound trains.  
One " " " westbound trains.

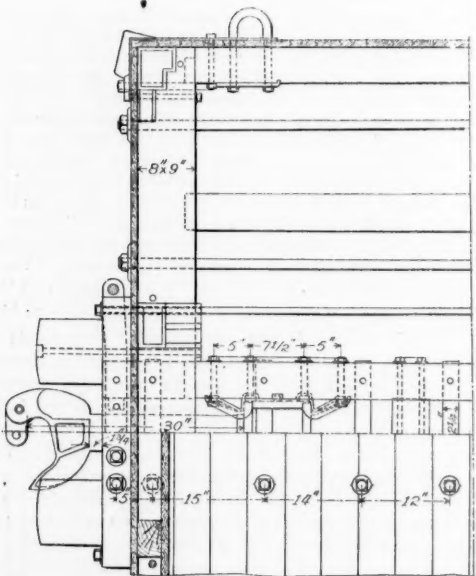
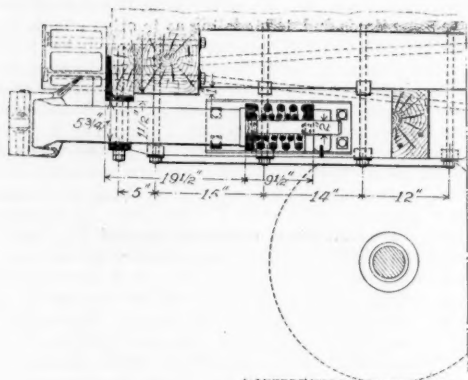
—EDITOR RAILROAD GAZETTE.]

**60,000-lb. Freight Car and Truck—Buffalo, Rochester & Pittsburgh Railway.**

The 60,000-lb. freight car for the Buffalo, Rochester & Pittsburgh Railway, shown herewith, has some novelties in construction. There is also a new design for the same road of a flat car constructed in a similar manner, the main points of difference lying in the side sills, which are 14 in. deep instead of eight for the box car.

This car suggests again the increasing rate of deterioration of freight cars in the great attention devoted to the construction of detail. A large amount of iron has been added where it is most needed. But little more can be done to enhance the strength of wooden cars. The next step must necessarily be toward a metal underframe of some sort.

The roof construction has been improved by the addi-

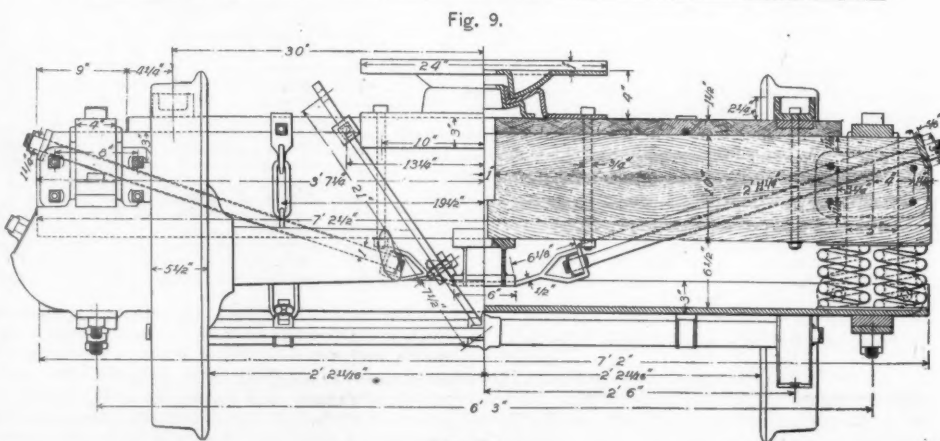
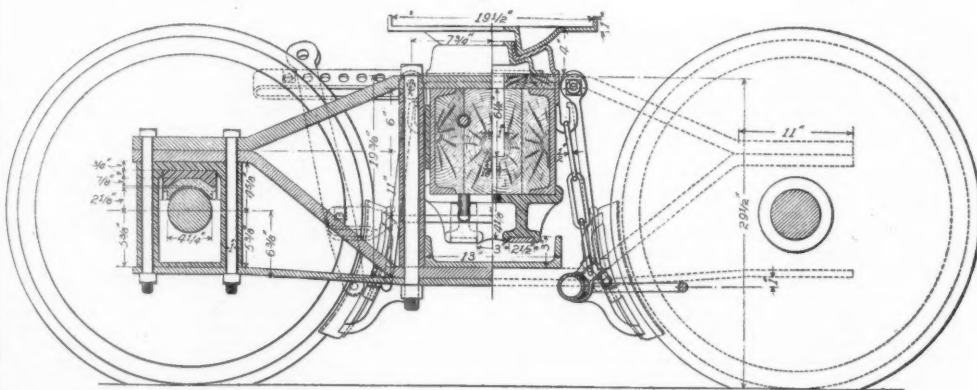
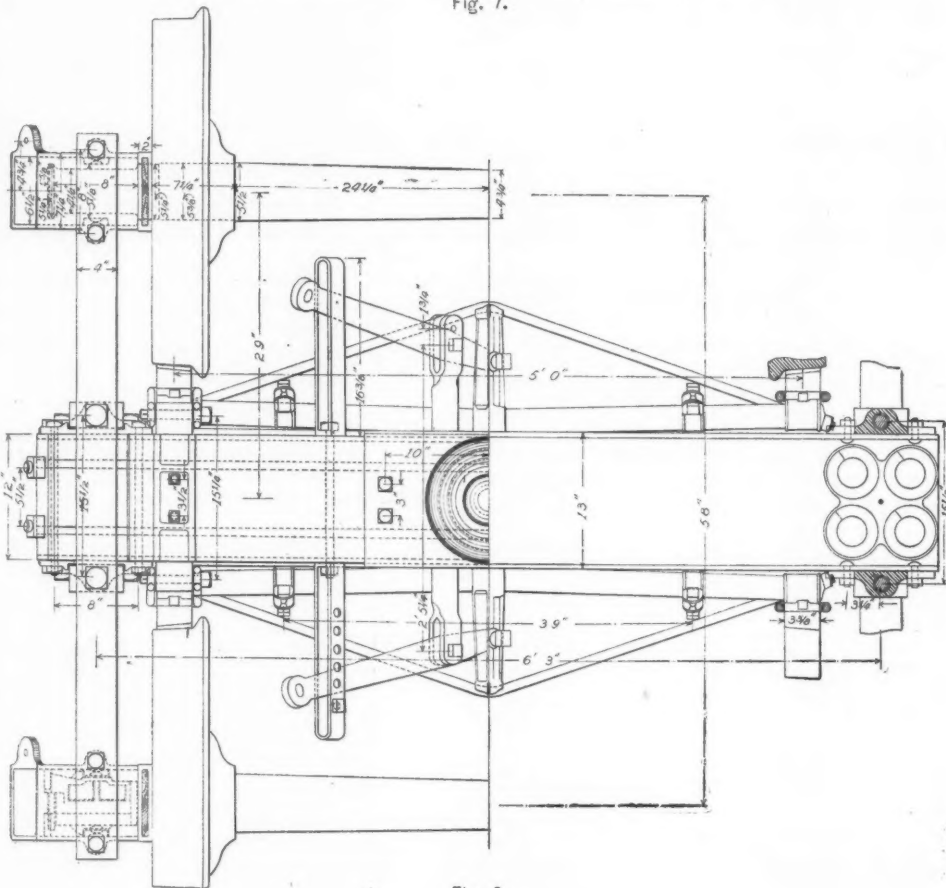
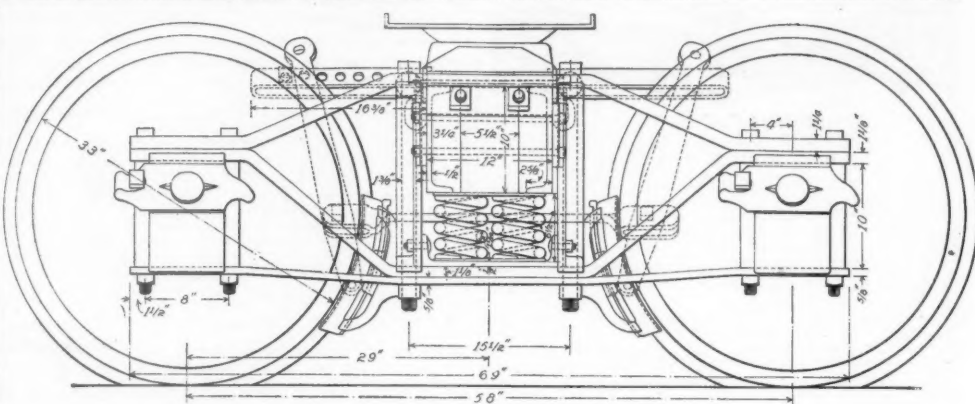


tion of a strap between the purlines and the head board, as shown on the longitudinal section, fig. 1.

The body bolster is formed of three pieces  $6\frac{1}{2}$  in.  $\times$   $6\frac{1}{2}$  in. passing under the sills and rabbeted to the sills and trussed with three truss rods of peculiar form, shown on the end elevation and section, fig. 3 and plan fig. 2. These rods pass through a wrought iron end strap 4 in. wide, with the head of the rod on the outer end. The inner end of the rods pass through a wrought iron stirrup on each side of the centre sills, with a nut within the stirrup. The stirrups are made of flat iron  $3\frac{1}{2}$  in. wide and extend over the tops of the centre sill. The object of these flat straps is to prevent cutting out the floor to allow the presence of the 1-in. truss rods.

The draft timbers are fastened by vertical bolts and two keys each to the centre sills. The ends of these timbers butt against the body bolster. The end sills are 9 in. x 8 in., and have a 4 in. x 10 in. buffer timber on the outside. A noticeable improvement in this timber is the addition of a piece of angle iron 6 in. x 4 in., against which the buffer stop on the drawbar may strike when the cars come together with sufficient force to compress the buffer spring. The proposed standard dead blocks are used, as shown on the plan.

Considerable saving in weight has been obtained in this design by the use of pressed steel, as in the case of the corner plates and drawbar stop. The engraving shows the old cast iron stop; but these are not being



TRUCK FOR 60,000-LB. BOX CAR.  
BUFFALO, ROCHESTER & PITTSBURGH RAILWAY.



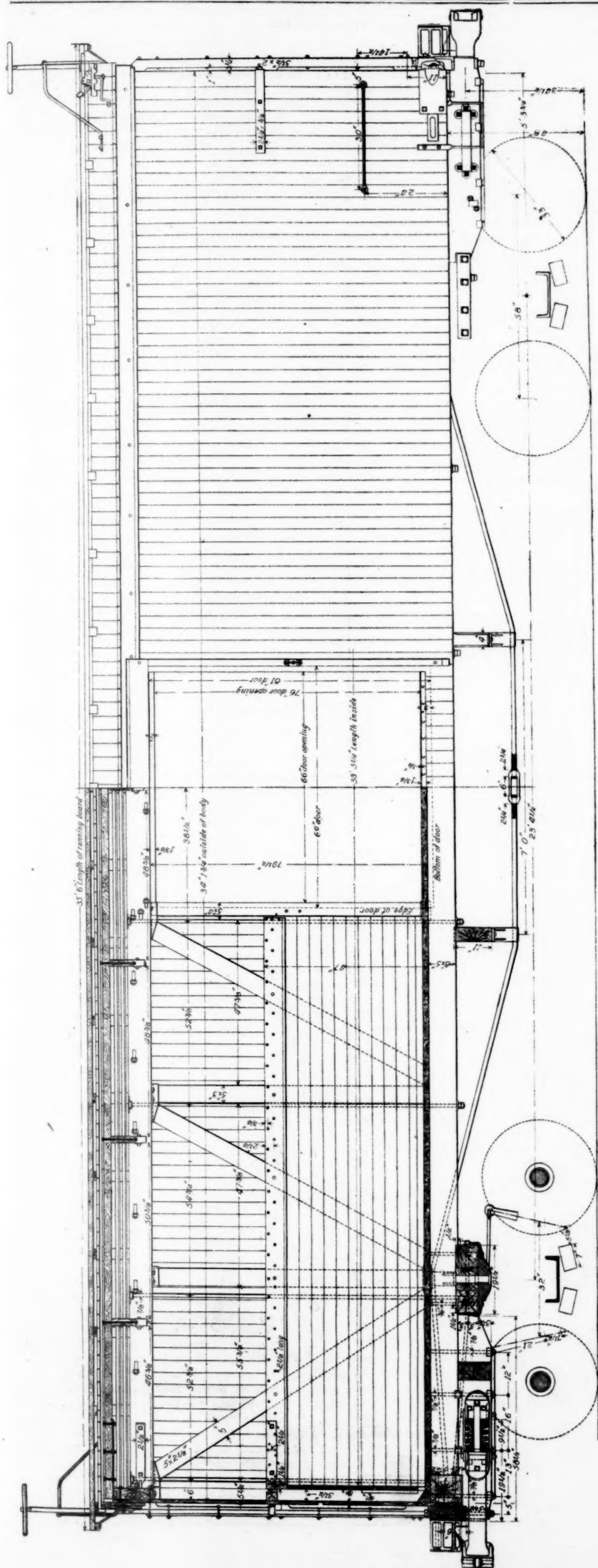


Fig. 1.

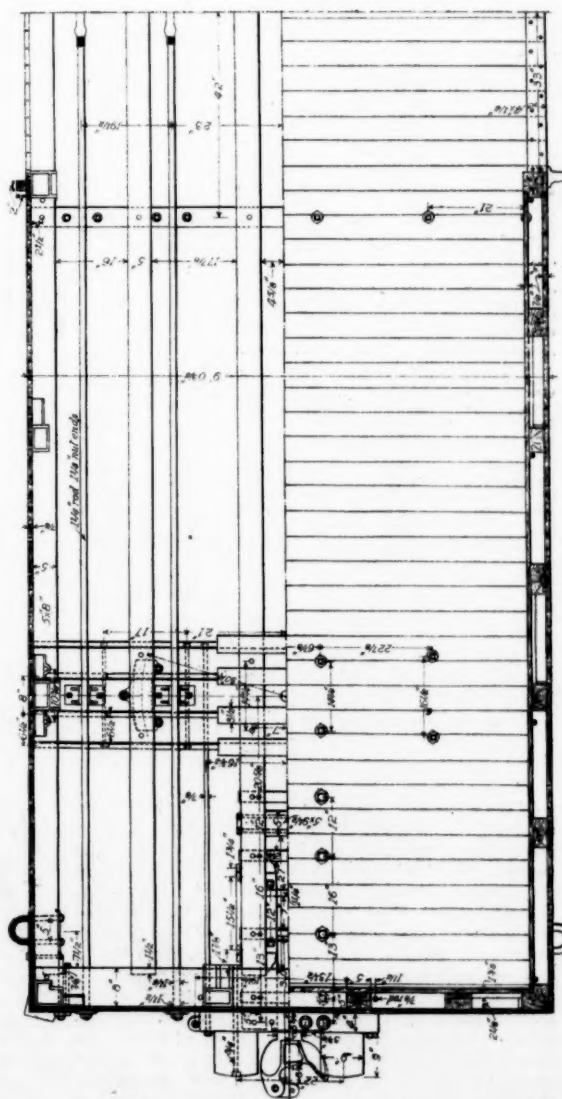


Fig. 2.

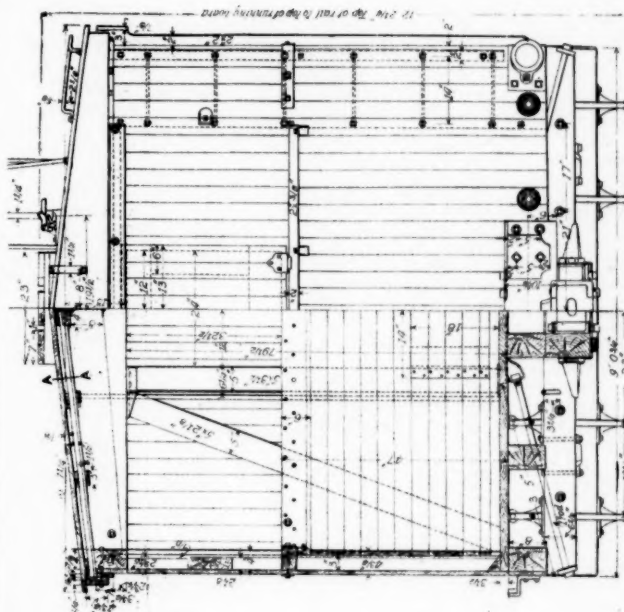


Fig. 3.

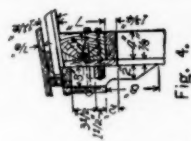


Fig. 4.

60,000-LB. BOX CAR—BUFFALO, ROCHESTER & PITTSBURGH RAILWAY.

Mr. A. DOLBEER Superintendent Motive Power.

used, the Schoen pressed steel drawbar stop being used instead.

To prevent leakage and to protect the timbers over the side doors a tin shield is introduced, as shown in the small section at fig. 4. Figs. 5 and 6 show the method of applying the pressed steel drawbar stop, and the construction is so good as to warrant the attention of car men.

The trucks are shown in figs. 7, 8, 9 and 10. Some peculiarities may be seen in the truck bolster. It is composed of three pieces of oak and two channel irons, the oak being rabbeted out to receive the channels, and all bolted together, forming a bolster 12 in. wide and 10 in. deep. The channels are 10 in.  $\times$   $2\frac{1}{2}$  in.  $\times$   $\frac{1}{2}$  in. Between the pieces of oak pass the truss rods, as seen in fig. 8. These truss rods are not unlike those used for the car body bolsters, and have stirrup straps on the inner end which pass under a truss block of peculiar form.

On these trucks the pressed steel centre plates and the National Hollow brake beam are used.

The axles are  $\frac{1}{2}$  in. in diameter  $\times$  8 in. long, with collars on the outer end of the journal. All bolts liable to become loose have keys outside of the nuts.

The weight of one complete car with trucks is 30,500 lbs. and that of one complete gondola car with trucks 27,500 lbs.

The following are the general dimensions of the cars and extracts from the specifications:

	Ft.	In.
Length over end sills.....	34	
Side door opening.....	5	6
Height of centre of draw head to top of rail.....	2	10 $\frac{1}{2}$
Width over side sills.....	8	11
End door opening.....	2	
Height of running board from top of rail.....	12	2 $\frac{1}{2}$

The side sills and stringers of Southern yellow pine. The end sills and tie timbers of oak. The frame must be trussed by four  $\frac{1}{4}$  in. rods, with pressed or rolled wrought iron turn-buckle, having right and left-hand threads in the middle of each. The truss rods must be upset at ends for the proper threading, as shown by drawing, and must not be welded. Care must be taken in screwing up that both portions of the truss rod enter the turn-buckle with the same number of threads.

The roof must be the Chicago corrugated roof, and framed as shown by drawing.

The side doors must be the Dunbar storm-proof door, as shown by drawing.

The draw timbers must be well secured with five  $\frac{3}{4}$ -in. bolts through each timber; four of these bolts to have cup floor washers, and two to pass through cast-iron lock plates.

Schoen drawbar stop, as shown by drawing. All bolts through floor of car must have cup floor washers, as shown by drawing.

The draw head must be smooth, and of the M. C. B. type, automatic coupler having a separate drawbar bolt 2 in. in diameter and  $\frac{9}{16}$  in. between keyway and end of drawbar.

All wrought iron must be of good quality and show a fracture of not less than two-thirds fibrous when broken by bending; it must have a tensile strength of not less than 48,000 lbs., and an elongation of not less than 15 per cent. in a section 2 in. long. Brake chain must be smooth, have a workman-like finish and stand a proof test of 5,000 lbs. without deformation, a breaking weight of 9,000 lbs. and an elongation of 10 per cent.

Yellow pine must be of long leaf virgin pine cut in Georgia, Florida, Alabama, or Mississippi, and be free from splits, shake and knots, except in case of knots larger than  $\frac{1}{2}$  in. in diameter, which will be allowed if their location is such as not to impair the strength of the piece. The poorest piece used for sills must have three corners free from sap.

White pine must be free from sap, shake, large, loose, or black knots. All pieces must be full length as called for in attached bill of timber, except in case of running boards and upper purlines, which may be in two pieces. Oak must be tough white oak, of full size, and free from sap, shake and large, loose or black knots. Sound heart will be admitted in end sills when cut from small trees. All joints of frame must be coated with fennel oil. All iron work must have one coat of black japan.

Each car will be inspected after completion and while in the course of construction by a representative of this company, who may also inspect at parts to see that they conform to these specifications and drawings, and any car or any material that does not so conform will be rejected.

Wheels must be of cast iron and subject to specification and inspection at foundry as required below, and be accompanied by a guarantee from makers for service of not less than three years. They must be of double plate pattern, 33 in. in diameter, and weigh not less than 500 lbs. each. The treads must be smooth and practically free from "sweat," and must have clear white iron extending to a depth of not less than  $\frac{1}{4}$  in. at the throat and having a variation of not more than  $\frac{1}{8}$  in. throughout the same wheel. Each wheel must be so nearly cylindrical that when a true metallic ring is placed on the tread and bears somewhere on the cone, it shall at no part of its circumference stand more than  $\frac{3}{16}$  in. from the wheel tread. No wheel will be accepted the circumference of which differs more than  $\frac{1}{16}$  in. or less than 1 in. from the circumference of the wheel in which it is made.

Axles must be of hammered iron from No. 1 wrought scrap and fully up to the measurements shown by drawing. Each axle must be stamped on one end with letter designated by this B. R. & P. Co. to show who are the builders of car, and with figures to show date put in service.

### Wrecking Outfits and Handling Wrecks.

BY P. W. HYNES.

#### III.—TACKLES.

Of the many kinds of rope commonly seen, that known as Manila is best adapted to the wrecking outfit. Pure hemp rope is stronger, but its great cost is a bar to its general use. Ropes are "laid up" in many different ways, and the simplest form, as usual, is the best. This is called "plain laid," and consists of three twisted strands twisted together. "Hawser laid" rope is made by twisting three plain-laid ropes together, so that a section would show nine strands. It is used principally for mooring vessels, and is said to absorb less water on account of its tighter twist. But this extra twist impairs its strength. The less the fibres of a rope are twisted the stronger they are, and only as much twist should be given to each strand and to the whole rope as will hold the fibres in place and distribute the strain equally to all parts. Tarred rope was formerly much

used, but there is no question that the acids are injurious to the fibres and will in time destroy them. It would be difficult to tell a man how to judge of a rope. He must learn by experience. One should always buy of a reputable firm, and should state exactly what quality is desired. The fibres should be long and evenly laid and the color fresh and even. The rope should feel firm in the hand, yet not hard twisted.

In figuring the safe strains for rope, many persons rely upon the tabulated statements of the manufacturers—for convenience, I suppose—since nothing could be less exact. Most of these tables are figured on the basis of 100 lbs. breaking strain for each yarn in the rope. There is no doubt that a good yarn will bear this strain singly, but it does not follow that, when in use, each yarn is equally strained. Let us watch a rope which is subjected to a slowly increasing strain until it is broken. As the strain increases the strands assume a longer lay and the diameter grows less. Then the rope appears to hold its own for a moment, when one strand becomes straighter than the others; next we observe a few yarns burst from the straightest strand, and as we watch they fly thicker and faster, until the whole strand is gone. The remaining two strands then stretch a little more, and one becomes tauter than the other. Then the breaking is repeated in a shorter time. The third strand follows in the same way and in still less time. From this it appears that neither the yarns of a strand nor the strands of the rope have been equally strained. The art of rope making is greatly improved of late years, and the machine-made rope is stronger than that made by hand, but I do not believe any rope can be made in which the strain is equally divided. My deduction is that ropes are always less strong than they are rated. Ropes are subjected to both external and internal wear. The former, which is due to contact with other objects, may be observed in the frayed appearance of any old rope. The internal wear is caused by the yarns rubbing against each other when under strain, and the effect is readily seen in the light dust which is found when any old rope is unlaid. They will surely lose in strength in proportion to the strains borne, and it must be remembered that a rope once broken has been strained to the utmost in every fibre, and consequently weakened.

Much can be done to prolong the life of a rope by giving it proper care, whether in use or not. It should be carefully rove in the blocks with the lay not against it, and all kinks and extra turns should be taken out in the first place. It should be always kept dry. A wet rope is more difficult to handle than a wire rope, and when wet, the fibres are under a severe strain even when not in use. This is due to the shrinking of every part longitudinally, and the consequent increase in diameter. Some authorities state that a rope loses 50 per cent. of its strength when wet. If tackles must be used in the rain or water they should be sheltered as much as possible, and put away as soon as they can be spared. Then at the first opportunity the ropes should be unrove and dried thoroughly. My own practice is to keep my ropes neatly coiled where the air can circulate through them, and my blocks hung up in pairs. I find myself repaid not only by the good condition of the ropes and the ease with which I can inspect and clean the blocks, but by the actual saving of time when it comes to rigging a tackle for use. It is often necessary to carry the tackles some distance from the car, and this can be done in less time and with greater ease if ropes and blocks are separate. Some time ago, while deadheading over a "foreign road," I volunteered to assist an acquaintance in clearing a wreck, and it took me two hours and a half with eight men to straighten out one of his large tackles, because it had been allowed to dry in the blocks. I could have made a purchase with my own materials in a quarter of an hour easily. It is often said that a good workman does not blame his tools, but it is equally true that he takes care of them. Ropes should be kept clean and, above all things, free from oil, which never fails to weaken them.

In the accompanying sketches I have given a few useful knots which will often be found of service in clearing a wreck. Fig. 1, A represents the "reef" or "square knot," which will not slip under strain. B, the "timber hitch," is used for making a rope fast to a tree, post or spar. C is the "swab hitch," and is used to fasten the ends of two ropes together, or the end of one rope to an eye spliced in the end of another. The orthodox swab makes but one turn around the bight; but two turns will hold as well, and will not jam. D is a "blackwall hitch" and is used as shown. E shows "two round turns and two half hitches," by which a good hold can be taken on a tree. When the two half hitches are drawn tight, we have the "clove hitch." The "boxline" F is generally useful and will take the place of the swab hitch or the blackwall hitch and will never jam under any strain.

Ropes for use in blocks should be pointed so that they may be rove easily, and a description of this process may prove useful. Tie a piece of strong twine tightly

about the rope from 12 to 18 in. from the end, according to the size of the rope. Pick up all the outside yarns and stop them back, cutting away enough of the remaining ones at different places to give the rope a taper for about four times its diameter, and leaving it, when marled or hitched over with twine, about one-half the full diameter at the smallest end. Then lay every other one of the outside yarns along the "point," and bind them at the beginning of the taper by two turns of twine hitched over them and drawn taut. Now, pick up one of the yarns from the point and lay it back along the body of the rope, putting the nearest back yarn in its place on the point, then take up the next yarn on the point, replacing it with the next one of the back yarns, and continue the operation until the whole rope has been gone around. Next hitch two turns of twine around the yarns as they lie along the point and close up to the other two turns. Continue as before until the point is reached, and if the yarns crowd each other toward the end, thin them out in pairs. To finish the "point" turn the ends of the outside yarns in against the point, forming a loop with each. Through the bights of these yarns pass several turns of twine around the point, haul the turns tight and make fast. Now draw the ends of the yarn tight home and trim them off all round the rope. If properly done the point will be hard and even and will appear to be woven over with the yarns. See fig. 2.



Fig. 2.

When a new coil of rope is opened for use it is full of extra turns and the first thing to be done is to get them out of it. This can be accomplished quickly by a very simple process, but one often sees a number of men struggling with a coil of rope and covering a great deal of ground to little purpose. Take one end of the rope according to the lay and dipping it through the centre of the coil run it down into a large coil against the lay, then dip the top end through that coil and proceed as before. Repeat this if necessary and dip the top end again, running it into an ordinary sized coil with the lay. The rope is now ready for use and the next question is that of reeving the tackles. Rope should always be rove with the lay as before stated, that is, in such a way that if followed around several times it would form a right-handed coil. Suppose we select a pair of double blocks and place them each on its side a few yards apart with the becket on the inside and the hooks or shackles on the outside. Attach the top end of the rope to the becket in block No. 1, and then turn the coil over and pass the other end of the rope through the lower sheave of block No. 2, from left to right. Next pass the rope from left to right through the lower sheave of block No. 1, then through the upper sheave of block No. 2, and finally through the upper sheave of No. 1, always reeving from left to right. The tackle is now rove with the lay, and will run more smoothly and overhaul more easily than if rove in the opposite way. Had one of these blocks been threefold we should have rove in the same way precisely and left the middle sheave in the threefold block vacant till the last. Then the hauling part of the tackle, instead of passing through a side sheave and canting the block with the first strain, would pull directly on the centre of the block and fix it squarely in line. Likewise, had both the blocks been threefold we should reeve through the two lower sheaves first, through the two upper sheaves next, and, last of all, through the two centre sheaves. In this case the ropes will cross on one side of the tackle, but the effect will not be perceptible until the blocks are close together, and even then the strains will compensate each other and keep the blocks in line. Too much importance cannot be attached to this plan of reeving, both as regards following with the lay of the rope and reeving through the middle sheaves last. See fig. 3.

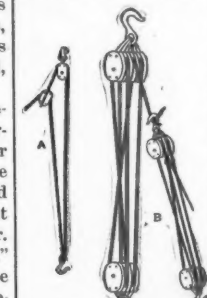


Fig. 3.

In rigging a purchase we may use any number of blocks, multiplying the power as often as we please. I remember seeing once the model of a purchase used in replacing the famous "Rocking Stone," at Penzance, in Cornwall, England, after it had been thrown down by a band of drunken sailors. This purchase consisted of 21 single blocks. But ordinarily a very simple arrangement will suffice, and the less complicated it is, the less time will be required to put it in place and to work it. In fig. 3, B, I have shown a very simple method by which great increase of power may be obtained. This is by attaching a light tackle to the hauling part of a heavier one. In such a case the weight can be moved only a short distance before the lighter tackle will be "block and block," and it will be necessary to "stopper" or hold what is gained until the auxiliary tackle can be overhauled. A good way to do this will be to double a piece of small rope about 10 ft. long and the size of a bell cord. Pass two or three turns around the three parts of the rope on the front side of the large block and about two feet from the block. Place a stout stick in the double of the small rope and twist till the three parts are close together. Then pass the ends of the small rope through the eye and take several more turns,



hauling as tight as possible, next take a few turns in and out between the three parts of the large rope, being careful to haul them tight; make the ends fast, and if carefully done the tackle will not give an inch. Then slack off the small tackle very gently, and if the large tackle holds, overhaul as quickly as possible, and take a fresh hold close to the stop. This method is called "luff

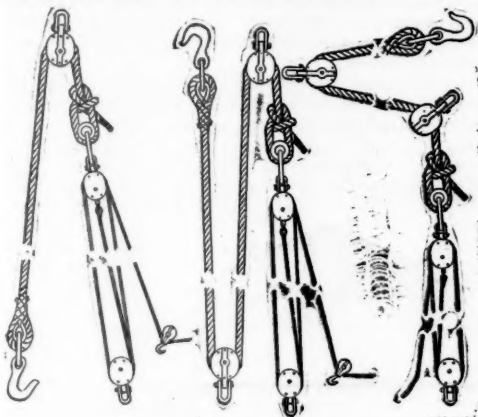


Fig. 4.

upon luff," and the power is limited only by the strength of the large blocks. Another powerful form is called the "Burton," of which examples are given in fig. 4. This may be rigged in a great variety of ways, both for economy of space and for increase of power. The simplest form is shown in A, fig. 3, but this can be elaborated to any extent. The "Spanish Burton," shown on the left of fig. 4, will be found very simple and powerful. With a 3-in. rope rove in a gin block for the "runner" and a "whip" of 1½-in. rope rove in two double blocks, this purchase will lift 25 tons. To find the power of any purchase multiply the strain on the hauling part of the tackle by the number of parts of rope. In this case there are five parts of rope in the tackle which are balanced by the runner on the other side, giving a power against the gin block of 10 to 1.

When hand power is depended upon, the best results are obtained from men who are accustomed to the work; but with "green hands" much can be accomplished through a little careful instruction on the spot. The tackle being hauled snug, let the men be placed on the hauling line far enough apart to avoid interference with one another. Each man should have a firm foothold and a chance to brace himself if possible. At a given word let every man swing back and hold there for a few seconds to give the ropes a chance to render and to allow the strains to adjust themselves. Then, without relinquishing the strain on the rope, each man slides one hand forward, and then the other, and waits for the next word to haul.

On some roads wire rope is used for switch ropes, but I think Manila is better. A Manila rope 3 in. in diameter and of three strands is equal to the tractive force of any engine, and can be coiled away in less space than a wire rope. It is more flexible, and is less likely to be injured from improper handling. If kept dry it will last as long.

A more important question is that of the links and hooks for switch ropes. In practice we often find these nearly useless, because they will fit neither the drawhead nor the coupling pin and link. At one end of the switch rope should be a link narrow enough to enter any drawhead and wide enough to receive a standard pin. At the other end of the rope should be a strong, light hook so shaped as to readily engage any coupling link. See fig. 5. The switch chain should be made of ½-in. iron, and fitted at one end with a link similar to that described for the switch rope. At the other end should be a grab hook shaped to fit the chain. Thimbles for use with large ropes, such as switch rope hooks and links and becket of large blocks, are usually made heart-shaped, but the circular form has some great advantages. In turning it will not cut the rope. It will not collapse under strain, and it can be easily made. A good plan is to bend a strip of boiler steel 14 in. by, say, 4 in. into a circle and weld the ends together, then shape it to take the rope and draw down the edges.

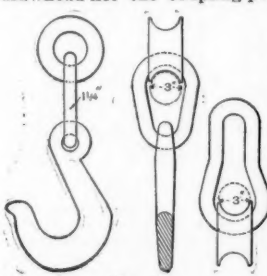
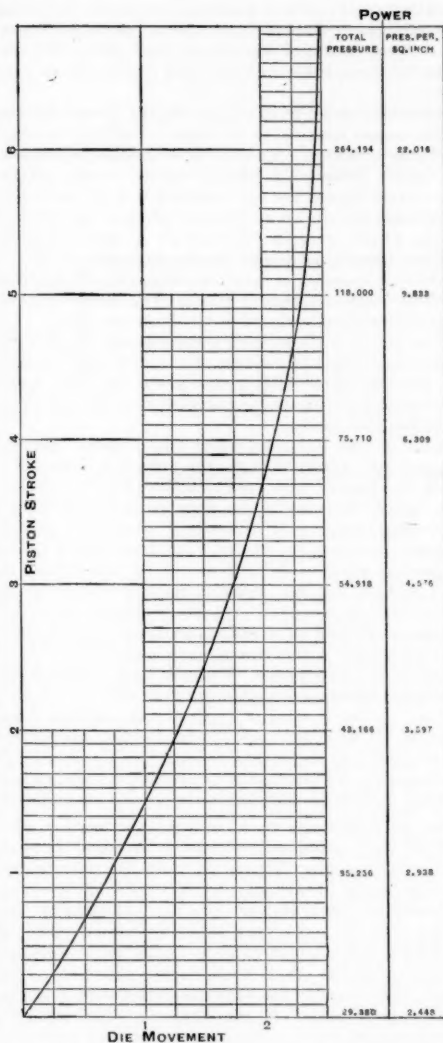


Fig. 5.

#### Diagram of Die Pressures—Bayley's Brake-Beam Forging Machine.

In the *Railroad Gazette*, Nov. 21, we gave illustrations of the forging machine for the Westinghouse brake-beam, invented by Mr. R. W. Bayley of the Westinghouse Air Brake Company, and at that time referred to diagrams showing the power of the toggles and the pressure derived from their motion. These diagrams are given herewith. For the main die the toggle is operated by steam cylinders 15 × 7½ in., and 100 lbs. steam pressure. Under this force, the leverage of the



Forging Machine—Diagram of Fillet Die Pressure.

die produces a pressure on the die for 1 in. movement, as shown by the diagram, of 40,072 lbs., equivalent to 2,726 lbs. per square inch, and at 3 in. piston movement the total die pressure is 73,688 lbs.; while at 6 in. the enormous pressure of 232,727 lbs. is reached.

With the fillet die and toggle at 6 in. piston movement, the total pressure is 264,194 lbs. The cylinders connected to the toggle driving the fillet die are 12 in. × 6½ in., with 100-lb. steam pressure.

The area of the welding surface worked by the fillet die is 12 sq. in., while that worked by the main die is 18 sq. in.

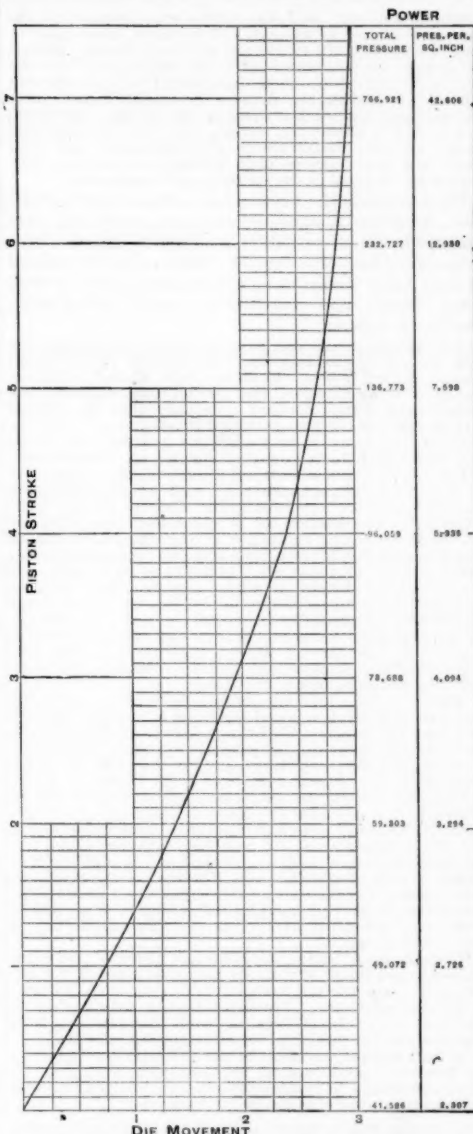
We do not remember to have ever seen the power of forging machines shown in this way, and it is worth the attention of bolt makers and those who are using such machinery.

#### The Counselman and Peasley Cases.

Judge Gresham has denied the petitions of Charles Counselman and J. C. Peasley, made before him in the Circuit Court at Chicago, asking for a habeas corpus to relieve them from the imprisonment imposed by Judge Blodgett, for contempt in refusing to answer questions and produce books and papers in the investigations of alleged violations of the Interstate Commerce law before the Grand Jury, as fully reported in the *Railroad Gazette*. In doing so, Judge Gresham confirms the decision of Judge Blodgett, and upholds the Interstate Commerce law and section 860 of the Revised Statutes as compelling a witness to testify, relieving him from the use of his own evidence on a criminal prosecution against him, but permitting the use of evidence which may be obtained through admissions which he may himself be compelled to make in regard to specified transactions in violation of law.

In the Counselman case Judge Gresham first reviewed the history of the case, as already outlined in these columns, and then proceeded as follows:

"The fourth amendment to the Constitution of the United States declares that the people shall be secure in their persons, houses, papers and effects against unreasonable searches and seizures, and the fifth amendment declares that no person shall be compelled in any criminal case to be a witness against himself. It was urged in behalf of Counselman that the questions which he refused to answer violated the privilege secured to him by these amendments. By the Interstate Commerce law it is made a criminal offense, punishable by fine and imprisonment, for any officer or agent of a railroad company to grant any shipper of merchandise from one state



Forging Machine—Diagram of Main Die Pressure.

to another, and for any shipper to contract for or receive, a rate less than the tariff or open rate.

"Section 860 of the Revised Statutes of the United States declares that 'no pleading of a party nor any discovery or evidence obtained from a party or witness by means of a judicial proceeding in this or any foreign country shall be given in evidence, or in any manner used against him, or his property or his estate, in any court of the United States, in any criminal proceeding, or for the enforcement of any penalty or forfeiture.' Under the fifth amendment a person cannot be compelled to disclose facts before a court or grand jury which might subject him to a criminal prosecution or his property to forfeiture. If, however, there be a statute which declares that the testimony of a witness in a case or proceeding shall never be repeated against him or his property in any other case or proceeding, there is no necessity for claiming the privilege secured by the amendment. If the protection of section 860 is coextensive with that of the Constitution a witness is entitled to no privilege under the latter. In effect, Counselman says: 'If I should answer the questions it would appear that I have violated the interstate commerce law, and my admissions might be offered against me hereafter.' The sufficient answer to that position is, should he hereafter be prosecuted for the offense, section 860 would not permit his admissions to be proved against him. The privilege cannot be claimed when it appears that the witness has been acquitted or convicted of the offense about which he is asked to testify, that he has been pardoned for it, or that it has been barred by lapse of time, and should Counselman answer the questions which he refused to answer his disclosures could never be used against him or his property in any subsequent proceeding."

The court then referred to the case of *Boyd vs. U. S.* (116 U. S. 618) upon which Counselman relied as justifying Counselman in his attitude before the grand jury. "This case," he said, "is clearly distinguishable from the Counselman case. In the former case, the owner was treated as a defendant and he was required to produce evidence upon which a judgment of forfeiture might be entered against his own goods. Counselman refused to testify in a proceeding before the grand jury to obtain evidence, not upon which he might be indicted, but upon which others might be indicted. It is further urged in behalf of Counselman that should he testify before the grand jury in obedience to the order of the District Court, he might disclose facts and circumstances which, although immaterial in themselves, would open up sources of information to the government, whereby it might obtain evidence not otherwise obtainable to secure his conviction, and that therefore the immunity secured by section 860 is not equal to the protection of the fifth amendment. That amendment was adopted not to shield men from the consequences of their crimes, but that they might not be obliged to furnish evidence of their own guilt, and when the disclosures of a witness, however guilty they may show him to be, can never be repeated in any subsequent proceeding against him or his property, he is as fully protected as the Constitution intended he should be."

"If through threats of violence a man confesses he has



committed murder and states who was present at the time and where the weapon and the dead body may be found, and he is afterward put on trial for the offense, he cannot be confronted with his confession, but the person who saw the crime committed is a competent witness, although the prosecutor might never have known there was such a witness but for the confession, and it may be shown by others that the weapon and dead body were found where the defendant said they could be found. The petition is dismissed and the petitioner will remain in the custody of the marshal."

The decision in the Peasley case, after a review of the case, in which it appeared that the grand jury were engaged in the investigation of alleged violations of the Interstate Commerce law by Thomas Miller, General Freight Agent of the Chicago, Burlington & Quincy road, when Peasley was subpoenaed to testify before them, proceeds as follows:

"It appears from the first report of the grand jury that Peasley's examination was limited to a criminal charge against Miller. Evidence had already been obtained tending to show that Miller had violated the statute, and it was deemed necessary that the grand jury should see the papers which Peasley was asked to produce. He testified that while, by general orders, he had authorized the payment of checks on vouchers approved, he had never seen or approved the paper described in the subpoena; that he had no knowledge of the consideration for which the Gallup checks were given or the transaction out of which they grew; that he did not know of the existence of the checks or papers when he was served with the subpoena requiring him to produce them, and that after he heard of their existence he ordered the officers in whose custody they were to hold them, and not produce them before the grand jury; that he had no authority from the company to produce the papers called for or any others, and that he declined to produce them for the reason that their production would tend to criminate him and the company, and subject it to penalties and forfeitures.

"Peasley's testimony shows that he was not guilty of the offense which the grand jury was investigating, and therefore the production of the papers demanded would not criminate him, and his refusal to produce the papers was unauthorized. If, however, the showing which he made before the grand jury had been different and it had appeared that the production of the papers might criminate him, then for the reason given in the Counselman case he could not claim immunity under the fourth and fifth amendments. If a witness cannot claim the privilege for the benefit of himself he cannot claim it for the benefit of another, and Peasley's refusal to produce the checks and vouchers because their production would criminate the company of which he is an officer is based upon nothing in the Interstate Commerce law or the Constitution.

"Corporations acting as common carriers between states are not liable criminally for violations of the Interstate Commerce act, nor are they exposed to its penalties and forfeitures. For some reason satisfactory to Congress only the officers of such corporations and shippers may be punished for violating the statute.

"It follows that the order of the District Court adjudging Peasley in contempt of its authority and that he should be fined and imprisoned was authorized, and he will remain in the custody of the marshal."

Both cases will be taken to the Supreme Court, and it is likely that the investigations on the part of the Commission will be suspended for the present at Chicago, as the grand jury has adjourned. The decision of Judge Gresham was not unexpected, as it was generally thought that he would confirm the findings of Judge Blodgett. These cases are accepted by both parties as affording a good opportunity to test the Interstate Commerce law on these points.

It is possible that the recent action of the roads in raising the grain rates from the Missouri River and beyond above those ordered by the Commission may also result in a test case to establish the right of the Commission to fix rates, as it is intimated that complaint will be made to the Commission by some of the shippers that the roads are openly disregarding the orders of the Commission, and asking that the Commission proceed against them.

There is another side to the case, which may yet be ventilated if a general "shaking up" should come. It is well known to the roads that the shippers are always ready to evade and violate the law and are continually approaching the employees of the roads with propositions to manipulate or cut the open rates. In fact, it is known that many shippers do not hesitate to play one commercial agent against another in the hope of obtaining a concession. Should the decision of Judge Gresham be confirmed, and roads use the evidence in their possession, in many cases it would carry consternation into the ranks of the shippers.

#### Buildings and Structures of American Railroads.\* NO. 10—OIL STORAGE HOUSES.

BY WALTER G. BERG.

Oil storage houses serve for the storage of the oils as received ready for use from oil works or dealers. The process of mixing the crude oils, where done by the railroad company, is conducted in so-called oil mixing houses, which will be discussed separately. Storage houses can be subdivided into general store houses and supply houses. In store houses the oil is shipped from stock to different points along the line in barrels, iron drums, or large cans. In supply houses provision is made for dealing out the current supply in small quantities. While the above classification and division of oil houses are correct, and, as a rule, clearly defined in practice, there are a large number of cases where the distinctive features of several of them are merged and contained in the same building.

Any structure or shed alongside a track offering space

for the storage of barrels under cover will answer for a general store house. A platform or skids for facilitating the handling of barrels to and from cars should be provided, and good ventilation is essential. It is also desirable to make proper provision (by suitable trestling or troughs inside the house), to allow oils to be transferred from damaged barrels to good ones, or to be drawn into iron drums or large cans for shipment over the road.

Oil storage houses to be used as supply houses for the current supply required in the vicinity call for a number of special features in their construction and operation, which, collectively, tend to make a good design. Where these houses are not connected with an extensive system, the oils are received in barrels, casks or iron drums, which are either placed on a raised shelf or trestling, tapped and the oil drawn, as required, or the contents are emptied at once into large iron tanks, from which the current supply is taken. The latter method is preferable where large amounts of oil are used.

In the first case the interior arrangements of the building are very simple, consisting of a raised shelf, bench wall, or trestling for holding the barrels above the floor, with drip boxes or drains underneath to catch any drippings from the faucets.

In case the oil is emptied into large tanks, suitable arrangements should be made for lifting the barrels on top of the tanks. The tanks should be set some distance above the level of the floor to allow oil to be drawn from them. It is, therefore, customary to put the tanks in a basement, the floor of which is sunk below the general yard level, with a second story above it, from which the oils are dumped through holes in the floor into the tanks below. This second floor is very useful to keep barreled oil in excess of the tankage capacity of the house, and is also employed to store waste, tallow and other similar supplies. Where a second story is not desired, the barrels are hauled up skids with ropes on to runways of old iron rails on top of the tanks, from where the oil is discharged. When the amount of oil used is small, and shipments are made into store only at long intervals, the erection of a two-story building is not advisable, unless the additional storage space is required.

Some oils, especially those required for lighting purposes and lubricating car journals, where used in large amounts, are usually shipped in tank cars, in which case large storage tanks are placed in a cellar below or to one side of the building. The oil can thus be discharged from the tank cars into the storage tanks by gravity through a pipe with proper goose neck, hose and valve connections. It is then usually pumped, as required, into a smaller set of tanks, called supply tanks, appropriately located in the main building with the tanks for barreled oil. The tank cars could be run up an incline and the oil discharged directly into the regular supply tanks; but the former method has the advantage of keeping the bulk of the stock in a separate, closed compartment, and does not require unusually large supply tanks inside the main building.

The location of an oil storage house for dealing out the current supply of oil should be preferably alongside a track leading to or from an engine house, coaling or water system, or facing any track that engines usually take when coming in from or preparing to start out on a run, so that they need not go out of their way to get their supply of oil. As a rule, the question of supplying oil promptly to engines will control the location, although in certain cases the wants of the car service or shop department will have preference.

In large yards or shop systems, small branch oil shanties are established at different points for the convenience of car inspectors and shop hands, the supply being sent from the main oil house in large cans or drums. These buildings are usually small frame structures, sheathed and roofed with corrugated iron. The interior is fitted up with shelves or trestles for the oil cans, bins for holding waste, and racks, pigeon holes and shelves for miscellaneous supplies and car inspectors' tools.

In cold weather the oils in a supply house must be heated, to render them sufficiently fluid to run properly in discharging from barrels into the supply tanks, or in drawing oils. Where the stock carried in the house is very small, a stove is used, either in the same space or in an adjoining room separated by a perforated partition, or the partition is cut away back of the stove, and the opening closed with wire netting or iron bars. Where the stock is large, and the danger and loss to neighboring structures in case of a fire would be considerable, steam heat should be introduced, the steam being supplied from a special boiler, located in an annex to the building, or in a separate building, or supplied from the main boilers of a shop system, or from boilers in use in the vicinity. Where the oil is dumped from a second floor, it is customary to have steam coils on that side of the room along which the barrels are placed before being emptied, while barrels not to be used immediately are kept on the cool side of the room. Steam coils arranged along the walls back of the supply tanks serve to heat the contents of the latter. As different oils require varying degrees of heat, it is best to put steam coils mainly back of the tanks with the heavy oils, the general temperature of the room or a smaller number of coils sufficing to keep the lighter oils at the proper temperature.

The following general remarks apply to all oil houses. It is essential to keep the main stock, so far as possible,

isolated from the room, where the men enter to draw supplies. The most scrupulous cleanliness is requisite to reduce the danger from fire, and the fire service provisions should be the best obtainable. No open lights should be allowed in the building; the lighting should be done by electricity, if feasible, or by lamps with reflectors, arranged in recesses in the outside wall, the recess being closed on the inside of the house with a fixed glass panel and on the outside with a small door. A fire proof construction of the building is desirable at all important locations.

The following descriptions of oil storage houses in actual use may prove interesting in connection with the above general remarks on the subject.

*Frame Oil and Waste Storage Shed at Perth Amboy, N. J., Lehigh Valley Railroad.*—In connection with a large oil mixing plant at Perth Amboy, N. J., the Lehigh Valley Railroad has a frame oil and waste storage shed,

shown in fig. 1, which can serve as an illustration of a cheap storage shed. The building is a one-story frame structure, 100 ft. x 38 ft., divided into two rooms, the one for storage of oils

in barrels and the other for storage of waste in bales. A loading platform runs along a track on one side of the house. The floor consists of 2-in. plank on mudsills. The building is sheathed with horizontal weather boarding and roofed with tarred roofing felt on boards. The roof trusses are spaced 10 ft. centres. The height from floor to truss is 12 ft. in clear.

The principal timbers used are as follows: Sills, 6 in. x 8 in., on blocking; posts, 6 in. x 8 in.; plates, 6 in. x 8 in.; tie beams, two pieces, 3 in. x 10 in.; principal rafters, two pieces, 3 in. x 10 in.; truss braces, 2 in. x 10 in. and 2 in. x 8 in.; purlins, 3 in. x 6 in.; roof sheathing, 1-in. rough boards; corbels, 6 in. x 8 in.; knee braces, 6 in. x 6 in.; ridding, 2 in. x 4 in.

*Brick Oil House at Perth Amboy, N. J., Lehigh Valley Railroad.*—The brick oil house of the Lehigh Valley at Perth Amboy, N. J., shown in figs. 2 and 3, is a small

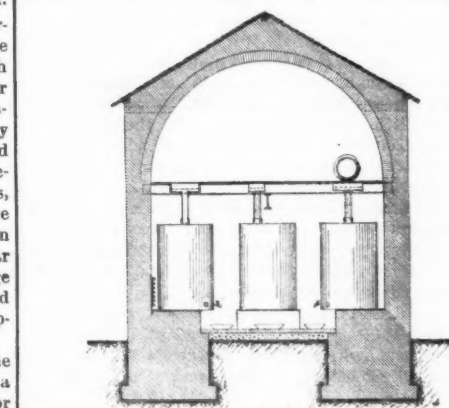


Fig. 2.

building with an arched brick roof covered with slate, forming a vault, as it were, in which oil is stored. The building is 20 ft. wide outside, 17 ft. 6 in. long and 16 ft.

3 in. high from the ground to the eaves. The side walls and arch forming the roof are 21 in. thick. The building has two stories, the lower one being 9 ft. high and the upper one 8 ft. 6 in. high at the soffit of the arch. The upper floor is carried by three 10-in. I-beams, supported at the centre by one 10-in. I-beam.

The lower story has space for seven oil tanks, each 4 ft. in diameter and 6 ft. high, set on brick benches. There is a cast-iron box in the upper floor over each tank with a screen and pipe leading to the tank underneath. Cast-iron drip boxes are placed under the faucets in front of each tank to catch any drippings. Three small steam coils run along the wall back of the tanks on one side of the house, which keep the temperature, as a rule, at about 60 deg. Fahr. The heavy oils, such as machine oil and valve oil, are placed in the tanks nearest the steam coils, while the lighter oils, as signal and headlight oil, are placed in the tanks on the opposite side of the house. The lower story is accessible through an iron door, so as to allow oils to be drawn from the tanks into cans and buckets. The upper floor is reached by an inclined trestling on the outside of the house, up which barrels of oil arriving on cars are rolled, and the oil then dumped through the cast iron boxes in the upper floor into the tanks below. A simple hoisting apparatus could be easily designed to hoist the barrels to the upper story, where the ground space available does not allow an incline to be built. In the operation of this house the daily supply of oils is drawn by an attendant, and placed on a small covered platform in front of the house, from where the enginemen take their supplies, as needed.

The house should be a little longer for a large road, and a simple hoisting contrivance would prove cheaper than a special incline. This oil storage house or vault can be considered a very good design, in case a small amount of oil is to be stored in a permanent fireproof structure.

*Stone Oil and Waste House at Lehigh, Pa., of the Lehigh Valley Railroad.*—The oil house of the Lehigh Valley at Lehigh, Pa., shown in figs. 4, 5 and 6, designed

\* Copyright, 1890, by Walter G. Berg and condensed from a forthcoming book on the subject.



by J. I. Kinsey, Master Mechanic, L. V. R. R., is a substantial two-story stone building with wooden roof covered with slate, 40 ft. x 30 ft., and 21 ft. from ground to the eaves. The walls are stone, 24 in. thick. The principal timbers are as follows: Tie beams, 6 in. x 12 in.; rafters, 6 in. x

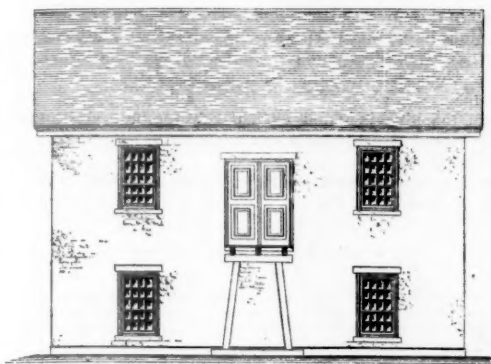


Fig. 4.

8 in.; braces, 6 in. x 8 in.; tie rods, 1 in. diameter; roof sheathed with 1½ in. boards. The basement floor is 3 ft. below the level of the track, and is flagged with stone. The second floor consists of cast-iron plates on 9-in. wrought-iron I-beams, the latter supported at the centre

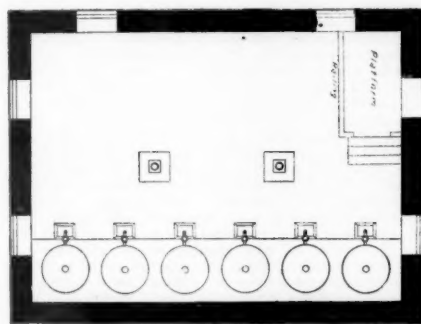


Fig. 5.

by a 12-in. wrought-iron I-beam, resting on two cast-iron columns. There are five windows in the first floor and six in the second one. Each window consists of twenty 8-in. x 12-in. lights. The window sills and lintels are cast-iron. The enginemen enter the basement through

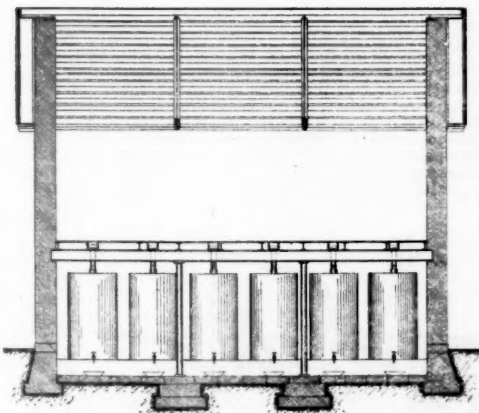


Fig. 6.

a door facing the track, and receive their oil supply from an attendant, or draw it from the large storage tanks. A light trestle walk leads from a raised platform next to the track up an incline to a 6-ft. 6-in. double door in the upper story, facilitating the handling of materials from cars to the upper floor. Oil is shipped to the house in barrels ready for use. It is dumped from the upper story through openings in the cast-iron floor into the large iron storage tanks in the basement. The upper floor is also used for storing waste. A wooden chute for the delivery of waste leads from the upper story to the basement.

**Brick Oil House at West Philadelphia, Pa., Pennsylvania Railroad.**—The oil storage house at the West Philadelphia shops of the Pennsylvania Railroad, designed and built by Joseph M. Wilson, plans and descriptions of which were published in the "Journal of the Franklin Institute," volume 62, page 318, is a fireproof building with stone foundations and basement, brick upper story, and iron roof, 30 ft. x 24 ft. outside, with a boiler house annex, 13 ft. x 13 ft. 6 in. The building is located at the rear of the round house and is intended for the storage of oil used in the shops. There is a platform in front of the building, 6 ft. x 14 ft., adjacent to a track, to facilitate the handling of material.

The main building is divided into a first floor and a basement, the latter having a door under the front platform wide enough to admit oil barrels. The foundations and walls, up to the level of the first floor, are of stone finished off with a stone belt course, the front platform being of stone also. Above the first floor the walls are of brick, 9 in. thick, with pilasters 13 in. The basement floor

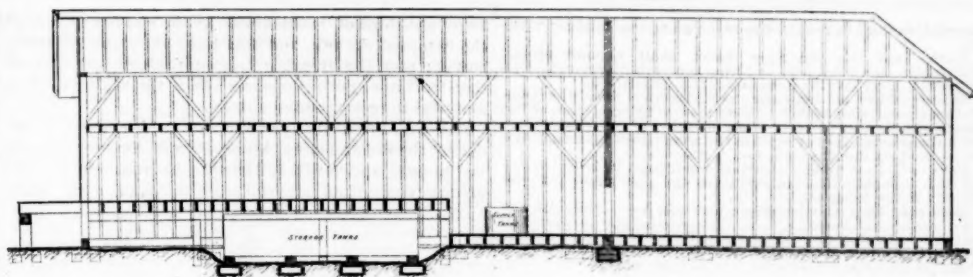


Fig. 9.

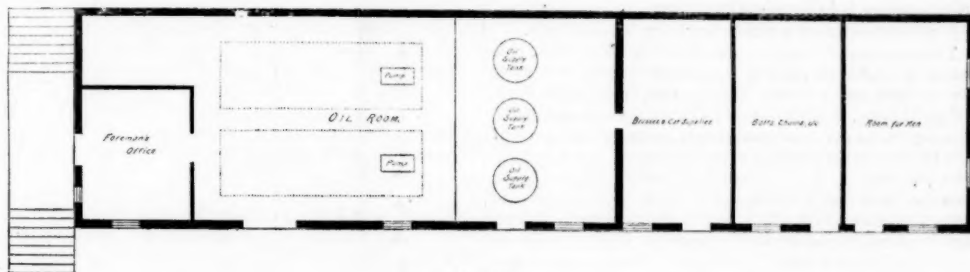


Fig. 10.

is of brick laid in cement and having drainage into a sewer. On each side of a passage way, 7 ft. wide, low platforms of brick are built on flat brick arches for the support of oil tanks. The first floor is supported through the centre by two cast-iron columns sustaining wrought-iron I-beams, from which spring flat brick arches. The cast columns are of ½-in. metal, 3 in. external diameter at the top and 4 in. at the bottom, and rest upon firm stone foundations.

To provide light at night and to prevent taking any fire into the oil rooms, four small windows, one light each, 18 in. square, of heavy glass set permanently into an iron frame, are built into the wall between the main portion of the building and the boiler room, and a gas burner is placed before each window on the boiler room side, so as to shine into the main building when lighted. Vertical pieces of 4 in. cast-iron pipe are built in the arches of the first floor over openings in each tank of the basement, to allow basement tanks to be easily filled from the oil room above, and also to afford facilities for the introduction of pumps to transfer the oil from these tanks to tanks on the first floor.

The basement tanks are rectangular in form, with an inclined bottom being so made that any sediment may collect in front and be easily removed, when necessary, through an opening provided for the purpose. There are three of these tanks on one side and four on the other, the large tanks holding 1,730 gals., one smaller one 1,618 gals. and the remaining three 1,130 gals. each. There are four large cylindrical tanks of 642 gals. each, and three smaller tanks of 361 gals. each. The total capacity of tanks is 13,867 gals., or 385½ bbls. The tanks are constructed of boiler iron.

The building is so designed that a mixing apparatus, if desired, could be put on the first floor.

**Brick Oil and Waste House, Mexican Central Railroad.**—The brick oil and waste house of the Mexican Central Railroad, the design for which was furnished by F. W. Johnstone, Superintendent Mexican Central Railroad, shown in figs. 7 and 8, illustrates a novel departure from the customary methods

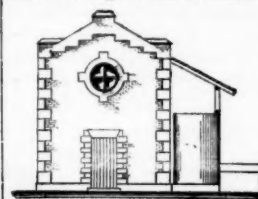


Fig. 7.

in the United States of placing the oil tanks in a closed building. In this case the oil tanks are located under a small projecting roof outside of a brick building. Pipes lead from the foot of the tanks into the interior of the building, by means of which the oil is drawn, as required. The structure is a low brick building, 18 ft. 6 in. x 19 ft., and 18 ft. 3 in. high inside from floor to ceiling joists. In the shed annex, which is 18 ft. 6 in. x 7 ft., there are seven oil tanks, each 6 ft. 6 in. in diameter and 10 ft. high, with pipes leading into the main building, as mentioned above. Alongside the oil shed annex, there is a raised platform, 5 ft. 9 in. wide, elevated 4 ft. above the top of the adjacent track. The oil is shipped to the house in barrels on cars. The barrels are unloaded on the platform and drawn up to the top of the tanks by means of skids and ropes. Two iron rails on top of the tanks form a runway, on which the barrels are rolled into position and allowed to drain into the proper tanks below. The waste is stored inside the house.

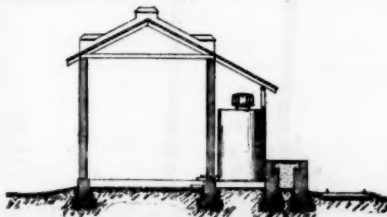


Fig. 8.

Mr. Johnstone states that this style of oil and waste house meets the requirements on the Mexican Central Railroad very satisfactorily, so that it would seem that for Southern climates the novel features introduced in this design would prove advantageous.

**Frame Oil Storage and Car Inspectors' House at Packer-ton, Pa., Lehigh Valley Railroad.**—The frame oil storage and car inspectors' house of the Lehigh Valley, at Packer-ton, Pa., shown in figs. 9 and 10, is a one-story frame building with loft, 33 ft. x 20 ft., sheathed and roofed with galvanized, corrugated iron, No. 20 gauge. The interior

is divided into four rooms, namely, the oil room proper, a room for storage of brasses and sundry car supplies, a room for bolts, chains, iron, etc., and a room for the use of the men. The partition between the oil room and the room for car supplies is of brick and extends all the way to the roof, thus forming a fire wall. All the other partitions are of wood. At one end of the oil room the floor is raised to form a platform inside of the house level with the loading platform in front of the house, which is the same height above the track as a car floor. Oil arriving in bulk in tank cars is discharged, through proper fixtures and piping, into two large iron storage tanks in a basement or cellar underneath the platform in the oil room. Oil arriving in barrels is dumped through openings in the floor into the storage tanks below. On top of the platform are two rotary pumps with which the oil can be transferred from the storage tanks to three supply tanks set in the lower part of the room. These supply tanks or mixing tubs are of iron, 30 in. high by 48 in. diameter, and are used to hold lubricating oil for cars and for mixing oil and waste for packing car journals. Ranged around the walls are a number of pigeon holes, each about 18 in. x 26 in., for the storage of oil and waste buckets, jacks, wrenches, tools, etc. All these tools and appliances are numbered, and each car inspector or greaser has his own kit and place to keep it on the shelves. In one corner of the oil room a 10-ft. x 12-ft. space is partitioned off for a foreman's office, on one side of which is the reporting window for men to report when going to or leaving the work. The supply rooms and room for the men are suitably fitted with shelves, lockers, benches, etc. The loft of this building is used for the storage of waste in bales. There is an iron door in the fire wall to allow communication between the two ends of the loft, and there is a small iron door down stairs in the brick wall between the oil room and the room for car supplies, to allow supplies to be passed out to the men as they come into the oil room to get their tools or fill their buckets.

#### The Latest Attempts to Secure Harmony.

##### THE PRESIDENTS' NEW AGREEMENT.

The meeting of Presidents of Western roads in New York, Dec. 15, to consider the reorganization of the Interstate Commerce Railway Association was attended by representatives of all the principal roads in the territory west of Chicago and St. Louis except the Chicago & Alton and the Kansas City, Fort Scott & Memphis, and by Chairman A. F. Walker, and the banking firms of Drexel, Morgan & Co., Kidder, Peabody & Co. and Brown Bros. & Co. were each represented. The following resolutions were passed without a dissenting vote, but the Chicago, St. Paul & Kansas City refused to vote, Chairman Stickney asserting that this agreement is no stronger than those heretofore made. The independent position of the Chicago & Alton is well known. The resolutions are as follows:

**Resolved**, That the presidents here assembled agree to recommend to their respective boards of directors the passage of the following resolutions:

**Whereas**, It is to the benefit of the public and of the railroad companies whose lines are situated west of Chicago and St. Louis that they should co-operate closely with each other in the management of their properties for the purpose of securing uniform, reasonable and stable rates for transportation and for such economies in the operation of their properties for the better accommodation of the public as will insure equitable returns upon the capital invested; therefore be it

**Resolved, First**—That a new association shall be formed between the several companies whose lines are situated west of Chicago and St. Louis, or such of them as may now become or may hereafter be admitted as members thereof.

**Second**—That the affairs of this association shall be under the management and direction of an Advisory Board, to consist of the president and one member of the Board of Directors of each company.

**Third**—That the Advisory Board so constituted shall have power to establish and maintain uniform rates between competitive points and to decide all questions of common interest between the members of the association. It shall also have entire charge, through properly constituted representatives, of all outside agencies for the securing of traffic at competitive points. If any officer or representative of any company shall authorize or promise, directly or indirectly, any variation from established tariffs, he shall be discharged from the service, with the reason stated.

**Fourth**—That the rates established and the policy adopted by the Advisory Board at any time shall continue in force, and be binding upon all companies composing the association until altered by subsequent action of the Board.

**Fifth**—A vote of at least four-fifths of the members of the



association shall be required to make its action binding upon all.

*Sixth*—That the Advisory Board shall appoint proper arbitrators, commissioners and other representatives and adopt bylaws to carry out the purposes of the association.

*Seventh*—That no company shall withdraw from the association except after 90 days' written notice by resolution of the Board of Directors to every other member of the association; with the proviso, however, that the association shall continue for at least six months from Jan. 1, 1891.

*Resolved*, That, under existing conditions, it is expedient for this company to set in operation the policy and plan indicated in the foregoing.

*Resolved*, That the president and Mr. —, one of the directors of this company, be and they are hereby appointed to be the representatives of this company in such Advisory Board, with full power to act for this company in carrying the foregoing preamble and resolution into full effect.

President Roswell Miller, of the Chicago, Milwaukee & St. Paul, was empowered to call a another meeting after the separate roads have acted on the resolutions, which action is to be taken before Jan. 1.

#### VANDERBILT AND PENNSYLVANIA AGREEMENT.

The meeting of western presidents in New York this week brought to light a document which, it is said, "went into effect about 10 days ago," and which is reprinted below. It will be observed that, assuming that the Pennsylvania Railroad completely controls the board of the Pennsylvania Company, the action of the Advisory Council named in this compact must practically be unanimous before it becomes effective. The resolutions have something very like a South Pennsylvania flavor, and it is intimated in some quarters that the phrase "10 days" should read "10 years." Other reports say the agreement has been drawn up for 10 years, but has never been made valid by the necessary approval. The paper is in the form of a series of resolutions, adopted by the directors of each of the companies interested, as follows:

*Whereas*, It is for the best interests of this company, as well as for the public benefit, that general harmony shall be maintained by and between the New York Central & Hudson River Railroad Company, the Pennsylvania Railroad Company, the Pennsylvania Company, the Lake Shore & Michigan Southern Railway Company, the Michigan Central Railroad Company, and the Cleveland, Cincinnati, Chicago & St. Louis Railway Company, for which object it is proposed to create an Advisory Council (consisting of the president and one director of each of said companies), with power to decide all questions of common interest, to avoid wasteful rivalry and to establish uniformity of rates between competing points. Such decision of such Advisory Council when made by the affirmative vote of the representatives of five of said companies, and the rates and policy thereby established, to continue until altered by a similar vote at a meeting of such council, unless 30 days shall have elapsed without a meeting after a request therefor shall have been made in writing by any one of such companies; now, therefore, be it

*Resolved*, That, under existing conditions, it is expedient for this company to set in operation the policy and plan indicated in the foregoing preamble.

*Resolved*, That the president and one of the directors of this company be, and they are hereby appointed to be the representatives of this company in such Advisory Council, with full power to act for this company in carrying the foregoing preamble and resolution into full effect; this company reserving the right to withdraw from this arrangement upon resolution of its Board of Directors, and after 90 days' notice in writing shall have been given to every other company.

The most favorable view of the Western Presidents' new agreement is that of "one of the presidents" interviewed by the New York Tribune. He said:

The agreement is the best and strongest that the Western roads have ever adopted. The vital point is that it places the rate-making power in the hands of a central body. I myself will not be able to change a rate. Another immense gain is that any action can be taken by a four-fifths vote of the Advisory Board. At present it is in the power of one man or one road to make trouble. Under the plan proposed, even if the Alton or the Chicago, St. Louis & Kansas City does not come in, there will be 15 roads acting as a unit in the determination of Western questions. Granting even that only 10 or 12 roads adopt the plan through their directors, that will be an immense gain to the situation. It reduces the number of independent factors to be dealt with. When the Advisory Board is organized it will possess the power to make provisions for arbitration or for the regulation of traffic as stringent as may be. The agreement is fully as strong as Mr. Gould's proposition, which was presented, but not discussed, at Monday's meeting.

President Cable of the Rock Island said:

The Rock Island will go into this agreement with the honest intention of living up to it. If there is only one other company with it, the Rock Island is bound to carry out this agreement. The plan may not be all that we could wish, but it has elements of strength in the fact that the agreement is for six months, and no company can withdraw without giving three months' notice. That is a great improvement on previous agreements, and I think we have taken a long forward step. It looks to me as if the association would be continued for a long time.

#### Steel Spikes.

Messrs. Dilworth, Porter & Co., Limited, of Pittsburgh, having had numerous inquiries for spikes made from a better material than old iron rails, have concluded to adopt steel. They recently, at their mill, made a series of tests of this material, selecting for the purpose 50 steel Goldie spikes. The following gives briefly the results: First test: The heads were flattened parallel with the body of the spike at one blow of a 600-pound steam hammer; stroke 18 in. Second test: The spikes were then placed in a vise, and turned or twisted two and a half times around, without fracture or breaking the skin, as shown in fig. 1. The twisting was accomplished by the use of a 4-ft. lever and the power of two men, thus showing great stiffness as well as toughness. Third test: The spikes remaining were then frozen in a freezing mixture to 20 degrees, and the head flattened out at one blow of a steam hammer, as shown in fig. 2. Fourth test: The spikes were then taken out of the mixture, quickly screwed in the vise, and twisted three and one-fourth times around without fracture; when turned three and one-half times they twisted off. Fifth test: The spikes were ground away in the neck under the head and then flattened out at one blow of the steam hammer. Sixth test: Spikes ground away as before and then hammered back at right angles with body, as shown in fig. 3. This latter test shows that a steel spike may be worn

away one-third of its thickness by the chafing action of the flange of the rail, and still have excellent resisting power; and the freezing test admirably demonstrates that frost does not injuriously affect the ability of this material to resist sudden shocks.

The call for a change from iron to steel was pointed out by the Roadmasters' Association of America at their last annual convention in Detroit, the recommendation of the committee on spikes, nut locks, etc., being

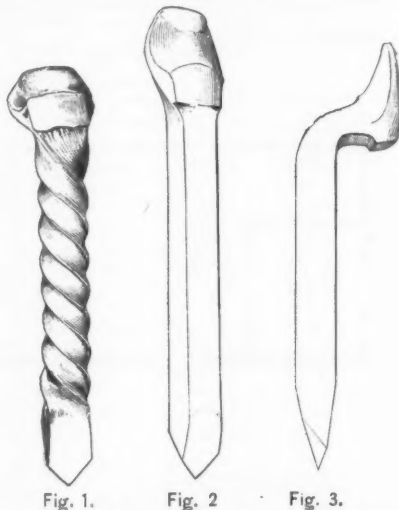


Fig. 1.

Fig. 2.

Fig. 3.

unanimously adopted, which was as follows: "We recommend that the spikes should be of present form,  $5\frac{1}{2}$  in. long  $\times$   $\frac{3}{8}$  of an inch square, of steel, having a point neatly finished, and of such a shape as not to mutilate the tie or turn in driving.

#### Three-Spindle Universal Vertical Boring Machine.

The Berry & Orton Company's boring machine, which we illustrate herewith, is one of their latest, and designed especially for use in car shops, or other heavy work where holes are to be bored either at an angle or square from the surface of the timber. We give the following specifications, as furnished by the builders:

The three boring spindles have each a movement of 24 in. across the table and a vertical one of 18 in. and can be set at an angle of 45 degrees or less. Each spindle, any combination of two, or all three can be moved at once across the table by means of the hand-wheel shown in part.

Each spindle has a quick return and is strongly driven by a 4-in. belt through a pulley 8 in. diameter, which gives abundance of power for driving the largest augers through the hardest kinds of wood.

The table is made of glued strips of wood veneered both on bottom and top with hard Southern pine  $1\frac{1}{2}$  in. thick, made of any length required; is fitted on the edge with a number of stops for duplicating work without the expense of laying out, also on the top with a system of bolsters and clamps that take in 24 in. in width to receive and secure the timber to be bored. The whole is mounted on a system of rolls 12 in. diameter placed

about 6 ft. apart, on which it is readily moved either by hand or power through the feed stand and shifting bar clearly shown in the illustration.

Three or four car sills or plates can be placed on the table at once and moved by power forward and back at the rate of 200 ft. per minute, or moved by the hand-wheel to the finest adjustment. There is one of these machines in operation with a table 75 ft. long. The usual length for freight car work is 40 ft. and for short work 14 ft. The total weight with a 14-ft. table is about 5,000 lbs.

Each machine is fitted with a countershaft, sixteen auger bits of assorted sizes and a full set of forged steel wrenches.

For further particulars address Berry & Orton Company, Philadelphia, Pa.

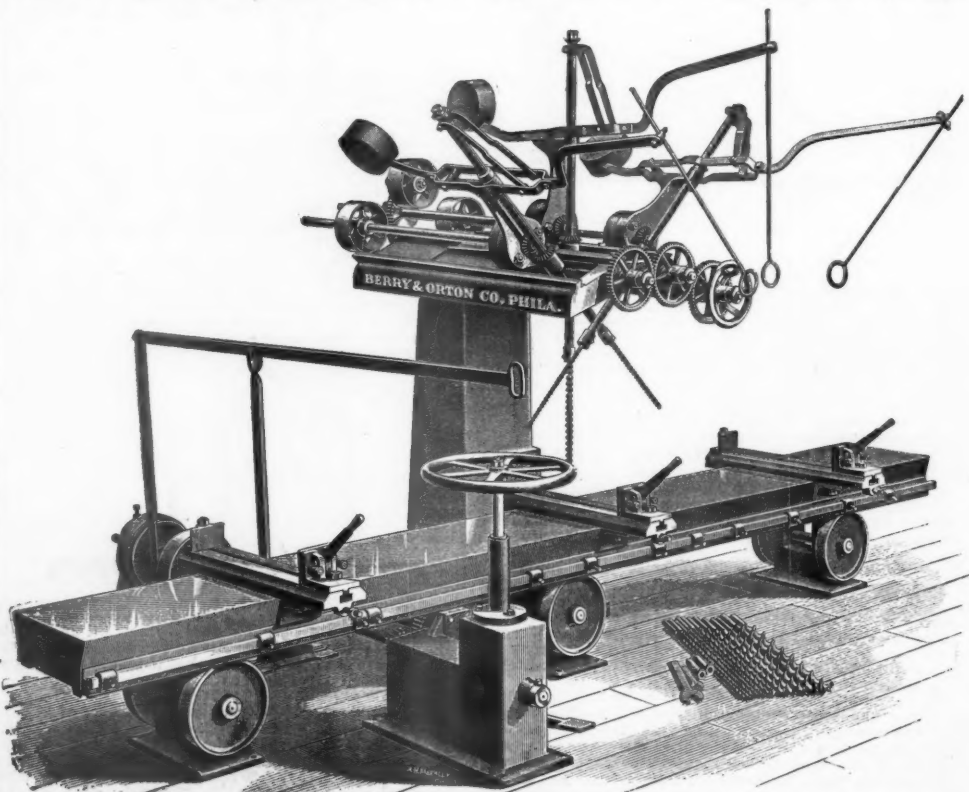
#### The Adams Direct Steel Process.

This process which was first worked at Indianapolis, where about 1,000 tons were made, and is now being worked experimentally by Messrs. Park Bros. & Co., of Pittsburgh, consists essentially in adding deoxidized iron ore to a bath of melted pig iron in an open-hearth furnace, and is a modification of the Siemens open-hearth process rather than of the Siemens-Martin process in which wrought metal or scrap steel is added to the bath of pig iron and no ore is used.

The ore is reduced by the action of natural gas in four hoppers, with flared sides, which are supported on iron columns directly over the furnace in which it is converted into steel. In these hoppers which have close tops and pivoted bottoms, to admit of dumping, the ore is heated to bright redness and subjected to the action of a stream of gas, passing back and forth through fire-brick checker work, which combines with the oxygen in the ore, but not with the phosphoric acid, and reduces the ore to a "sponge," which is probably a good deal like the product secured by Mr. Blair some 20 years ago. When the ore is deoxidized, the resulting sponge is dumped, still red hot, in four separate masses, into the bath of molten pig iron, where the charge receives nearly the ordinary open-hearth treatment.

This method is called by its inventor the "ore and pig, open-hearth process," in distinction from the Siemens process, which he calls the pig and ore process, as in the last named process the ore is the subordinate ingredient, and is charged direct into the bath of pig, its function being to desilicize and decarbonize the iron. In the newer process the ore, reduced to sponge, is the larger factor, the office of the pig being to act as a flux for the spongy iron, and to produce a homogeneous body comparatively low in silicon and carbon. In the Adams process the phosphoric acid is dropped into the bath in an unredded state, and melts into the slag as phosphoric acid, in which state the major part can be removed by promptly tapping off the slag; but if sufficient time is given for deoxidation the phosphorus is taken up by the steel; hence the amount of phosphorus contributed to the steel by the ore employed depends on the promptness and thoroughness with which the slag is removed. As an example: A charge in which the pig (one-half the charge) analyzed 0.10 in phosphorus, and the ore (other half of the charge) gave 0.18 phosphorus in the metallic iron contained; while the steel produced showed phosphorus 0.055. Thus only 0.005 of the phosphorus of the ore was retained, 0.175 of it having gone off in the slag, the 0.05 being accounted for by the pig.

As it is claimed that the ratio of iron in the sponge may be as high as three or even four to one in the pig iron employed for the bath, it seems possible to produce a good quality of steel from non-Bessemer ores, or pigs. Upon the effect of phosphorus, sulphur, silicon and carbon on steel made from materials which, to the extent of one-half or over, have not passed through the blast furnace much has already been accumulated to confirm an impression previously prevailing among some steel makers that direct process steel could "carry" a much larger infusion of all these metalloids than steel made



THREE-SPINDLE UNIVERSAL VERTICAL BORING MACHINE.



from pig, no matter by what intermediate process, and evidence so far accumulated during the working of the process seems to confirm the theory. The following examples are furnished by the Steel & Iron Improvement Co., the owners of the process:

From one heat of the following analysis, carbon, 0.19; silicon, 0.051; manganese, 0.77; phosphorus, 0.083; sulphur, 0.08, a bar  $2 \times \frac{3}{4}$  in. was hammered out and a  $\frac{3}{4}$  in. hole drilled in it, which was swaged out cold to  $\frac{3}{8}$  in. without cracking.

From a lot tested by the Louisville Bridge & Iron Co. a specimen of the following composition, viz., carbon, 0.18; silicon, 0.04; manganese, 0.46; phosphorus, 0.111; sulphur, 0.128 showed 72,100 lbs. tensile strength, 52 per cent. reduction of area on a sample  $1 \times \frac{1}{2}$  in. From another lot tested by the same company having the composition, carbon, 0.19; silicon, 0.098; manganese, 0.70; phosphorus, 0.114; sulphur, 0.115, a test bar  $1 \times \frac{3}{4}$  in. gave 68,500 lbs. tensile strength, 50 per cent. reduction of area.

Three heats rolled, tested and analyzed by the Spang Steel & Iron Co., Limited, showed as follows:

1. Carbon, 0.13; silicon, 0.055; manganese, 0.60; phosphorus, 0.117; sulphur, 0.093, gave 60,000 lbs. tensile strength, 36,000 lbs. elastic limit, 25 per cent. elongation in 8 in., and 52 per cent. reduction of area. Test bars taken from  $\frac{3}{8}$  in. plate.

2. Carbon, 0.16; manganese, 0.92; phosphorus, 0.085; sulphur, 0.075, gave 64,720 lbs. tensile strength, 36,610 lbs. elastic limit, 23 $\frac{1}{2}$  per cent. elongation in 8 in., and 50.35 per cent. reduction of area. Fracture 45 degrees and silky. Test bar,  $0.406 \times 1.400$  in.

3. Carbon, 0.21; manganese, 0.98; phosphorus, 0.114; sulphur, 0.08, gave 66,950 tensile strength, 42,570 elastic limit, and 20 $\frac{1}{2}$  per cent. elongation in 8 in. Test bar,  $\frac{3}{4}$  in. It was defective, and the reduction of area could not be ascertained.

It is hoped that by this process three heats per day can be made, instead of two as by the Siemens process, in consequence of the greater fusibility of sponge over raw ore, and an economy of from \$19.32, as compared with high-grade steel, to \$5.98, as compared with inferior grades, will be obtained.

As one distinguished visiting ironmaster doubted the success of direct processes in general, it seems pertinent to quote from the letter of another, Geo. Y. Snelus, to the editor of the *American Manufacturer*. Mr. Snelus says, in part: "It is perfectly clear that there must be a very great economy if 50 per cent. of the steel ingot can be got directly from ore costing, say, \$7.50, counting 65 per cent. iron (with less than \$1 per ton as the cost of reduction), in place of pig iron at \$17 per ton. It appears to me also that the process will be even more advantageous when carried out on a basic hearth. Even with the acid process, the purity of the product must be greater than by the ordinary method, because it is well known that the phosphorus in the ore is not reduced at the low temperature employed, and only a portion of what the ore contains can in any case enter the steel; so that I am not at all surprised to learn that the steel made by this process is exceptionally low in phosphorus."

Another iron process not yet so thoroughly experimented with as the Adams process has lately been brought to the front in Virginia; that is, roasting the limonite or brown ores of that state so as to make them magnetic. This allows a nearly worthless ore carrying from 30 to 35 per cent. of iron to be concentrated by the magnetic separator to a 56 or 60 per cent. ore. The cost of roasting is stated at about 50 cents per ton. It is hoped that these concentrated ores will be available for steel making by the Adams direct process; if so, Virginia will become a large producer of mild steel.

#### A Bridge Failure in Kansas City.

Concerning the bridge span which fell under a freight train on the Kansas City, Wyandotte & Northwestern Railroad, Nov. 17, we have the following from the Receiver of that road, Mr. Newman Erb:

"A thorough investigation of the cause of the accident to our Kaw River Bridge at this place shows that the combination truss sustained practically no injury, and that it was in all of its parts sufficient for the uses intended, and with a factor of safety of very nearly three.

"The accident was due to the giving way of the gip plate on which the floor-beam rested. This released one end of the floor beam, which, under the strain put upon it, broke off at the other end. The brace bars with which the broken floor beam was connected forced another floor beam from its position, and this precipitated the train.

"The gip plate which broke was  $\frac{3}{4}$  in. though it was supported by hangers  $1\frac{1}{4}$  in. square. This, the Superintendent of the Missouri Valley Bridge Company advises us, was amply sufficient, but unfortunately the bridge builders had overlooked the fact that it was necessary that they should be so drilled and suspended as to throw the strain at right angles with the grain of the metal. The result was that the load was carried longitudinally with the grain, and, of course, in its weakest position. The accident is due to this fact.

"After the bridge was erected, the defect being latent, it could not be discovered by any ordinary or extraordinary inspection. We have had all the gip plates on the several spans of this bridge taken out and replaced with others in which care has been taken to provide against defects in hanging, and which are 1 in. in thickness. Though not deemed necessary, we are also fortifying all the floor beams."

#### TECHNICAL.

##### Manufacturing and Business.

The Hattiesburg Machinery & Car Mfg. Co. has been incorporated at Hattiesburg, Miss., by F. E. Colboth, G. E. Kemper, T. J. George and others. The company has secured a site, and will soon commence the erection of car shops.

The Lodge & Davis Machine Tool Co., of Cincinnati, O., has been awarded the contract by the United States Government for furnishing a large equipment of engine lathes to the Watervliet Arsenal, West Troy, N. Y., to be used in turning up heavy projectiles.

The Etna Machine Co., of Warren, O., has closed a contract with the Western Natural Gas & Iron Co.,

for a 400 h. p. engine to drive a train of rolls in the rolling mill now building at Marion, Ind.

William Sellers & Co., of Philadelphia, will enlarge their works by erecting a new machine shop,  $400 \times 200$  ft.

The Owen Automatic Signal Co., of Lynchburg, Va., has been incorporated with C. C. Dunn, Jr., President, and W. H. Wren, Vice-President, to manufacture the R. O. Owen patent railroad signal.

The Springfield Emery Wheel Mfg. Co., of Bridgeport, Conn., who a short time ago found themselves in financial embarrassment and under the necessity of calling a meeting of their creditors, have been granted the extension of time asked for in which to pay their debts. The management will be changed somewhat, although the services of the founders of the business will be retained. The works have not lost a day during the trouble, but only about a two-thirds force was employed. The works will now be pushed to their fullest capacity, and with the large line manufactured and with a good supply of orders on hand.

The Ansonia Brass & Copper Co. is enlarging its brass mill by an addition  $90 \times 155$  ft. similar to that begun some weeks ago at the wire mill. The departments are to be rearranged so that the output of the mill will be increased.

#### Iron and Steel.

Ground has been broken for the new 36-in. beam mill at the Homestead mill of Carnegie, Phipps & Co. It will take several months to complete the mill.

On Friday of last week the Edgar Thomson Steel Works again broke their record of rail making by turning out 1,441 tons in 24 hours, the previous best record having been 1,417 tons in the same time.

The puddling department of the Roanoke Rolling Mill, at Roanoke, Va., has recently been idle, undergoing considerable improvements, and new machinery being added.

The plant of the Chester Pipe & Tube Co. at Chester, Pa., owned and operated by the Potts Brothers Iron Co., Ltd., of Pottstown, has been sold to a new company, of which Col. Joseph D. Potts, of Philadelphia, is President.

#### The Rail Market.

Steel Rails.—Several meetings of manufacturers have been held in Chicago and New York, but no agreement has been reached, and there are many reports that orders have been taken under the open quotations. Some small lots have been sold in New York at \$28. No large sales are reported by the Chicago or Pittsburgh mills. The quotations at Chicago are \$31@31.50 for small lots.

Old Rails.—The market continues dull and featureless. Nominal quotations are: at New York, \$22 for old rails; at Pittsburgh, \$26@27 for iron and \$17@18 for old steel rails; and at Chicago, \$23.50 for old iron and \$17 for old steel.

#### New Machine Shops.

The Chesapeake & Ohio has under construction, and nearly completed, new shops and roundhouse at Clifton Forge, Va., and a new roundhouse at Handley, W. Va.

#### Tests of Materials of Arches.

Tests of the resisting powers of arches of different materials are about to be carried out on a large scale by the Society of Engineers and Architects of Austria. The tests will be divided into three groups. Group I. will comprise tests of strength and elasticity of the materials used in arch work; group II., resistance tests of small-span arches, and group III., resistance tests of bridge arches of spans of 23 metres (about 75 ft.). Special interest, it is thought, will be attached to the tests comprised by this last group. Different kinds of masonry and concrete arches will be tried and compared with an iron arch of the same dimensions. The arches are to be tested with special reference to their use as railroad bridges. The loads are to be gradually increased until the arches give way. Careful observations are to be made of the behavior of the latter during the different load applications; measurements of their distortion are to be carried out, etc. The trials will be conducted in one of the quarries near Vienna.

It is understood that the cost of the trials will be covered by various subscriptions by railroad companies and others, and that ample funds will be available for a thorough investigation.

#### A Steamer for the Victoria Nyanza.

Almost simultaneously with the revival of the project of building a railroad in German East Africa, comes that of providing a steamer for service on Lake Victoria Nyanza. The vessel, which is to serve German interests, is to be built at the large Hamburg works of Janssen and Schmilinsky. Naturally it is to be portable, and German steel will be used in its construction. The estimated cost of the vessel is about \$28,000. Arrangements have been made for the delivery of the vessel on the East Coast on June 1, 1891. Emin Pasha is to arrange for a harbor on the lake, and the sections of the ship are to be there put together by the European mechanics who have already been secured for the work.

#### Cheaper Aluminum.

Mr. Eugene H. Cowles, President of the Cowles Electric Smelting and Aluminum Co., of Lockport, has stated to a reporter of the *Sun* that their new process of electric reduction of pure aluminum directly from the ore has reached such a stage as to enable them to produce metal 98 per cent. pure at a cost of \$1.25 per pound. It is proposed to utilize the entire Lockport plant for the production of aluminum by the new process and the capacity of the works is estimated at from  $\frac{1}{2}$  to  $\frac{3}{4}$  ton per day. The production of aluminum in alloys of iron and copper will be abandoned at these works.

#### Petroleum Fuel.

The Great Western Argentine Railroad is about to try the experiment of burning crude petroleum in its engines. It has contracted with a Mendoza company for a large supply.

#### The Zigzag Tunnel.

The New York, Ontario & Western tunnel between Sidney and Walton stations, N. Y., is nearing completion. Work was begun in June of last year upon the tunnel. The approaches at either end are 2,600 ft. long, and the tunnel proper is 1,578 ft. long, most of the cutting being through solid rock. The approaches are finished, and over 1,200 of the 1,578 ft. of the tunnel proper has been excavated. It is expected that the cuttings will meet at the centre of the mountain by Jan. 1, and that the tunnel will be opened for traffic next spring. The reduction of the maximum grade at that point will be from 104 to 75 ft., and the shortening of the main line of road between Sidney and Walton will be about two miles. The estimated cost of the improvement is about \$600,000.

#### THE SCRAP HEAP.

##### Notes.

The Pennsylvania road is accused of seriously inconveniencing coal dealers by "seizing" for its own use a considerable quantity of bituminous coal in transit, the alleged object being to accumulate a large stock in anticipation of a strike of miners in the Clearfield region after Jan. 1.

A Denver paper states that certain street car lines of that city have just abandoned package tickets, which were in the form of coupon books, because the conductors stole the coupons from the passengers, "fumbling the books beneath their hands and tearing out a whole leaf from the back part" while ostensibly detaching only one coupon from the front.

The Grand Jury at Reading, Pa., has ignored the bills against eight officials of the Philadelphia & Reading charged with intimidating voters in the interest of the Republican state ticket at the last election.

The "Big Four" elevator in Sandusky, O., was burned Dec. 11. Loss, \$40,000.

Twelve hundred miners and laborers at the Rock Spring mines of the Union Pacific in Cheyenne have struck, because the company gave notice that it would pay the day workmen by the hour. It is said that the company intended forestalling the effect of an eight-hour law, introduced in the present State Legislature, which it is likely will pass.

The Chicago, Milwaukee & St. Paul is stirring up the ticket scalpers. With search warrants sworn out by the company's attorney various mileage books, coupon tickets, passes and card tickets to and from suburbs of Chicago were found and secured at the offices of J. A. Webb and G. A. Fellows. The company alleges that the tickets were secured through misrepresentation and false pretenses.

Eleven freight crews on the second division of the Colorado Midland, running between Leadville and Grand Junction, struck Dec. 11 for higher wages. The conductors asked for an increase from \$115 to \$125, and brakemen from \$75 to \$80 per month. Manager Collbran soon proposed arbitration and the men agreed to it and resumed their work. In addition to this he told them that if they desired to fully inform themselves as to the wages paid on other mountain roads he would secure transportation for as many as wished to go to Ogden and elsewhere, pay all of their expenses and continue them on the pay-roll during their absence.

The freight conductors and brakemen employed on the Chicago, Milwaukee & St. Paul ask an increase in pay. Conductors receive 2.88 cents a mile, and ask for three cents. Brakemen are paid 1.92 cents a mile, and ask for two cents. The basis of hours consumed in making a 100-mile run is now 12 hours. This the men want reduced to 10 hours.

The station clerks and freight handlers on the Chicago, Milwaukee & St. Paul have had their wages reduced 10 per cent.

The strike of the switchmen in the yards of the Baltimore & Ohio at Glenwood, Pittsburgh, Pa., was a failure.

Eight colored section hands of the South Carolina road are out on a strike because they could not get their pay increased from 65 cents a day "and provisions" to 75 cents a day and provisions. As the dispatches do not say what the provisions consisted of, whether roast chicken and Havana cigars, or hominy porridge and northern tobacco stems, economists will be unable to judge of the merits of the strike. When Mark Twain, as a miner in California, was overworked, he struck for \$400,000 a week and board; thus we see to what violent fluctuations the relation between money and "grub" is subject.

All the employees of the United States Rolling Stock Company in Anniston, Ala., struck Dec. 11. About 1,000 men are idle. The company has not paid any employees for four weeks, and could give them no satisfaction as to when it could pay.

##### Canadian Notes.

The contract for the building of the railroad pier at Digby, N. S., has been awarded to Mr. Nicholson, of Ottawa. His tender was the lowest, \$67,000.

The contract for the pumping plant, etc., at the Kingston dry dock has been awarded to John Inglis & Son, of Toronto, the lowest tenderers.

The foundation for the new Grand Trunk machine shops at Sarnia, Ont., north of the portal of the tunnel, has been laid by William Gibson, contractor. The building is to contain the boiler shops, engines for pumping the tunnel, furnishing power for the electric light and for ventilation, as well as the blacksmith shops, machinists' shops, and all the apparatus necessary for the operation of the tunnel when open for business.

##### Foreign Notes.

According to a government decree the sale of books at Belgian railroad stations has been stopped.

The construction of the first Siamese railroad which is to connect the capital, Bangkok, with the town Corat, and which is to serve principally for the transportation of lumber and cattle, has been placed in German hands. German rails and German locomotives are to be used exclusively.

With the recently completed alterations in the railroad stations at Spandau, Germany, the network of tracks in the immediate vicinity of the city has become exceedingly intricate. This is said to be particularly so near one of the crossings. To promote greater safety, therefore, the trains come to a stop at this point and take on board a pilot who is detailed to guide the trains into the stations.

A street railroad operated on the Mekarski compressed air system was given over to traffic at Berne, Switzerland, on Oct. 1. It is nearly two miles long and has an average grade of 11.4 per cent. The plant requires about 50 H. P., and this is furnished by turbine water wheels. The compressed air reservoirs are charged to a pressure of 30 atmospheres. The motor cars are designed to hold in all 28 passengers, and weigh about 15,000 lbs.

##### The Harris Excursion Car.

The Harris Palatial Car Co. is to conduct an excursion to the South in its new palace car "Jeannette." The party, consisting of 16 persons, will leave Boston Dec. 29 and will visit the Luray Caverns, Natural Bridge, Chattanooga, Lookout Mountain and Jacksonville. Stops will be made at Philadelphia and Washington where carriage rides will be enjoyed.





Published Every Friday.  
At 73 Broadway, New York.

#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The presidents have not learned much after all. The new Western agreement bids fair to have the same weakness as the old—a beautiful advisory board, but no joint agencies for acting on the advice. Stonewall Jackson once telegraphed to Richmond for “fewer orders and more men.” Mr. Walker would undoubtedly like to do the same thing.

The work of making tickets for the American Society of Civil Engineers still goes on, but the contested offices have narrowed themselves down to these: Katté vs. Fteley for resident Vice-President; Trautwine vs. Collingwood for Secretary; Boller vs. Bogart for Treasurer, and Childs vs. Brush for Director. It may be said, in general terms, that of these names the one mentioned first for each office stands for a change in the policy of the Society, while the other is for things as they are. Yet it is but just to say that Mr. Collingwood would bring to the office of Secretary many admirable qualities, and he would be quite sure to perform the duties with conscientiousness, industry and great thoroughness. A good deal of surprise has been expressed that the so-called Philadelphia ticket sent to the Direction should have borne the name of Mr. Collingwood instead of that of Mr. Trautwine for Secretary. Last Saturday a meeting of certain Philadelphia members was held in that city, including four who had signed the “Philadelphia” ticket. The majority voted to send to the St. Louis Society the name of Mr. Trautwine for Secretary. No objection was made to his nomination by any one present. At a meeting of St. Paul members it was agreed to recommend Fteley, Trautwine, Boller and Childs for the contested offices. Whatever may be the results of this election, it will have been an “educational campaign.” The affairs of the Society have not had such a stirring up since its organization.

#### The Interstate Commerce Commission on Classification and Rates.

The discussion of this subject in the last report of the Commission is, to say the least, unsatisfactory, and in some parts calls for serious criticism. It contains three assumptions with regard to rates and rate-making which by no means correspond to the facts. Putting them a little more explicitly than the Commission does, but without unfairness, they may be stated as follows:

1. That the carriers, in making their classification and in fixing their rates, take into account every consideration of a public nature which can fairly bear upon the question of public usefulness; and, by implication, that the Commission, being a public body, is much more competent to do this than the carriers.

2. That if the rates on one article are for any reason whatever put so low as not to pay a fair share of the fixed charges, other articles have to be charged higher rates than would otherwise be the case. In other

words, the low rates on one article are made up by extra high ones on something else.

3. That when a road makes low rates at any time or for any part of its traffic, the public is to a great extent justified in taking such rates as a standard of what is fair, and is still more clearly justified in reducing such charges as are above the average actually accepted by the road.

None of these points is in accordance with the facts. A railroad agent does not, as a rule, take into account a large number of questions of public usefulness in making a rate. He may bring these matters up when he tries to defend his action, but that is another thing. In making the rate he is actuated by a desire to have his road make as much money or lose as little money as possible. He will reduce rates wherever such action is likely to increase net earnings. Almost any moderate reduction, other things remaining the same, tends to make gross earnings larger. If a 20 cent rate is substituted for a 25 cent rate, in the great majority of cases the traffic will increase more than 20 per cent. after the change has had time to operate. But the larger volume of traffic will involve additional cost; and it becomes a delicate question, which can only be settled by actual experience, whether the increase in gross earnings will more than balance the increase in operating expenses. If it does so, the change is a good one, and further experiments are made in the same direction. If not, the policy is allowed to go no further.

It will be seen at once that cost and value of service are both involved in this process. If the cost of handling the shipments—leaving fixed charges wholly out of account—is high, the increase in operating expenses will be large in proportion to the additional traffic secured. For that reason articles which are expensive to handle will be charged high rates. If, however, the traffic is such that little will be carried at high rates and a great volume of business can be secured at low ones, it will then pay to lower the rate nearly down to the margin of direct expense. For this reason valuable articles will remain at high rates, because a lowering will not increase the shipments proportionately; while cheap articles, whose traffic would be destroyed at high rates, will be charged low ones.

This is charging what the traffic will bear. Under this system the railroad manager does not only what is best for his company, but what is best for the public also. Not that he tries to do it; but that, if he is intelligent, he does it without trying. He gives the cheap goods rates which they could not receive under any other system; and the development of traffic, which is thus rendered possible, in the end causes the high grade articles to go at lower rates than would otherwise be possible. Every attempt to base rates on cost of service exclusively, whether by a system of tolls, as was tried at first, or by an artificially equalized system of charges, as is now the case in many parts of Continental Europe, has resulted in keeping rates high instead of putting them low.

Under this system the rate for each article is in large measure determined by itself. So far from finding that a low rate on one article necessitates a higher rate on another, we see that reduction for the cheap articles makes them contribute more to the fixed charges of the road instead of less. It is doubtless true that if wheat were five dollars a bushel our railroads could charge more on that and less on some other things; but with the facts of the case as they are and wheat at 75 cents a bushel, a higher rate on wheat would simply kill the traffic, and no other articles could possibly gain by the change. No fallacy turns up more frequently than this idea of making up low rates on one article by higher rates on another, and none has less foundation in fact. If the roads are trying to charge all they can on each article separately, the loss of one line of traffic cannot make them put down charges upon another.

We do not mean to say that this system always works well. On the contrary, it gives so much discretion to railroad agents that they are almost certain to apply it unfairly. The Commission and the courts have the duty of seeing that it is fairly applied. If a reduction is made for one man and not for another, it is clear that the roads are charging what the traffic will not bear, for the favored competitor must drive the other out of business. If, as between two similar and competing articles, they are charging lower rates for one than they do for another, or if they are charging lower rates at one point than at another, there is also a strong presumption of unfairness, and the roads must show differences in circumstances and conditions to justify this difference of treatment. But this is a restraining power rather than a rate-making power. The principles underlying this equality and the application of those principles involve

questions of law for the courts to decide. The theory that the Commission should take the place of the railroad agents in initiating rates, and that having assumed this duty it should be practically free from the control of the courts, is one for which we can find no foundation in law, and which we believe would work disastrously in practice.

Still more disastrous is the attempt on the part of legislatures or commissions to take the average of rates actually received as a fair standard to which all charges can be reduced. If our railroads were well organized and free to pool their competitive traffic without interference from the law, there might be some justification for this view; but as matters now stand, they are not left free to make systematic rates of this kind. Honest and far-sighted railroad men are exposed to the reckless competition of dishonest rivals and of managers of bankrupt roads. Under such competition they must choose between letting the competitive business go altogether, on the one hand, and accepting rates which are unprofitable on the other. To make such rates the standard is to put the sound road on the level of its bankrupt or recklessly-managed competitor. That the Interstate Commerce Commission can for a moment countenance this view of the matter seems to us surprising. We do not believe that it would seriously apply it in practice, but the fact that it can adopt such a position even for an instant or for the sake of argument furnishes additional reason, if such were needed, against an extension of its rate-making power.

#### The Position of Dwarf Signals at Crossovers.

In our issue of Nov. 14 a correspondent raised the question of the proper position of dwarf signals, governing reverse movements over a trailing crossover on a double track line. The question was whether the dwarf signals should be put outside the tracks, so as to be on the engineer's side when the engine is running backward, in reverse movements over the crossover, or whether they should be put between the tracks, so as to be on the right-hand side of the track for trains running in the direction governed by those signals. Of course the position of the signals governing direct movements by the high speed routes does not enter into the question. We got the opinions of many of those who have become known in this country as experts in signaling, and these have been published in various issues. The last one received is that of Mr. E. H. Goodman, Vice-President and General Manager Union Switch & Signal Company. He says:

My opinion is that a greater degree of uniformity and simplicity can be had by placing all dwarf signals for a reverse movement on the right-hand side of the track to govern such movement, and I think that, for the time being, or while such switching movements are being made, they should be considered in the right direction with traffic, irrespective of the regular traffic movement. Consequently, for right-hand running these dwarf signals for reverse movements should be placed between tracks. I do not consider the point where a reverse movement is being made by an engine so as to have signals on the engineer's side has any bearing in the case whatever, as only under certain circumstances does he take the signal direct while making such movements, depending, as a rule, either upon his fireman or through his fireman for the signal from the rear brakeman.

A summary of the opinions received may now be made with profit. Those who think these signals should be put between the tracks are: C. A. Hammond, Superintendent Boston, Revere Beach & Lynn; A. H. Johnson, Johnson Railroad Signal Company; W. M. Grafton, Signal Engineer, Pennsylvania lines west of Pittsburgh; H. M. Sperry, Supervisor of Signals, Pennsylvania Railroad; E. C. Carter, Principal Assistant Engineer, Chicago & Northwestern; E. H. Goodman, Union Switch & Signal Company.

Those who would put them outside the tracks are: A. E. Mitchell, Mechanical Engineer Erie Railroad; J. H. French, Superintendent, Old Colony; C. H. Koyl, National Switch & Signal Company; J. J. Turner, Superintendent Pittsburgh Division, P., C., C. & St. L.; George Gibbs, Mechanical Engineer Chicago, Milwaukee & St. Paul. Mr. Charles Hansel, Consulting Engineer, Illinois Railroad & Warehouse Commission, would use either position, according to circumstances.

Six are in favor of putting such signals between the tracks and five would put them outside. The question, therefore, is not settled by weight of numbers; nor can it be said to be settled by weight of authority. The weight of argument is, however, in favor of putting them between the tracks. It has become a settled principle that on a double-track road, running right handed, signals should be on the right-hand side of the track relative to the direction of the movements controlled by them. On a road running left handed they should of course be on the left hand of the track; this because that is, in either case, the engineman's side. Every departure from a ground principle and a general custom should be avoided, especially in a matter so intricate as signaling often must



be, and in which the consequences of mistakes may be so serious.

Those who favor putting the signals outside of the tracks will perhaps say that the ground principle is to put the signals on the engineman's side, whether that happens to be to the right or left of any given track. But if the engineman's side is not always the same, we have to assume as the proper place for the signals that which is, in the great majority of cases, the engineman's side, viz., the right hand of the track (on a right-handed road), *right hand* being determined by the direction of the movement governed by the signal. Therefore a reverse movement over a crossover between double tracks should, to be consistent with the principle, be governed by a signal on the right hand of the moving train, whether the train is running pilot ahead or not, and whether it is on the head or the tail of the train. No other principle can be consistently followed on a double-track road, for even out on the main line engines must often be run backward, and it would not be suggested that special signals should be put between the tracks to govern such movements. Even for reverse movements at crossovers it is impossible to have the signal always on the engineman's side, for these are made as often with the engine running forwards as backwards. Mr. Sperry, in his communication published Nov. 28, has shown how confusing any departure from the general principle of putting the signals on the right hand of the movement will become in case of several tracks.

The one serious objection to putting dwarf signals between tracks that has been made by those who have taken part in this discussion is the liability to injury to men or to the signals themselves. This objection has weight, but in many cases signals *must* be put between the tracks, and it is only a matter of ingenuity to design them so that they will not be in the way, as pot-signals or dwarf semaphores like those shown on another page.

#### Proper Cylinder Capacity for Locomotives Working as Pushers on Grades.

We have in the past repeatedly called attention to the inadvisability of adopting any fixed rule governing proportion between the steam pressure and cylinder capacity, diameter of driving wheels, and weight on drivers of locomotives. Any rule of this sort, unless it takes into consideration the service in which the locomotive is to be operated, is misleading and defective, and will not produce, if followed, an economical machine.

No better illustration of this is needed than a recent case where a progressive young railroad mechanical engineer has designed a heavy pushing engine for grade work, and in it has discarded previous proportions between the cylinder capacity and the weight on drivers, and has adopted a new and more scientific plan, based on the consideration of the actual work to be performed by the engine. As a result, the locomotive will work with greater economy, will start trains easier, and be more satisfactory for a variety of reasons.

All engines, of whatever type, simple, compound or multiple expansion, can be worked economically only when the cut-off in the cylinders is kept within certain well-defined limits. Cutting off the steam too early in the cylinder, thus losing by condensation, or cutting off too late, thus losing by lack of expansion, is productive of bad economy. For this reason a locomotive should be examined in full view of the service which it is to perform, just as all other classes of steam engines are, to see if its point of average working will fall within the permissible range of cut-off; if not, then the dimensions of the cylinders should be changed until such is the case. No stationary engine designer or engine builder will guarantee reasonable or acceptable economy unless the load is proportioned properly to the size of the engine, as overloading or underloading increases or decreases the cut-off to a point outside of the limits of economical action. The same may be said of marine engines, and of every type of engine for that matter.

In the case of locomotives, there are, of course, other features of operation to be allowed for other than economical operation. The load must be started readily, and the force required is greatest at the start; hence, the cylinders must always be large enough to start the load even if they be too large or too small to work with economy after the train has been accelerated to the desired speed. In the case of the ordinary passenger engine, steam is used full stroke, with very bad economy, until the train is well started. From that time the cut-off is decreased and the economy increased until a maximum efficiency is obtained at a speed varying from 20 to 40 miles per hour, according to the design of the locomotive and the weight of the

train. At speeds greater than this the economy decreases generally until at 60 miles per hour and over the locomotive engine is less economical, because of the wire drawing, back pressure, and early cut-off, than the same locomotive is when using steam nearly full stroke at starting.

From this we learn that the mean effective pressure is much less at high speeds than at low speeds in a locomotive cylinder because the cut-off is shorter and because the wire drawing and back pressure reduce the area of the indicator card. In an actual case now before us the mean effective pressure changed as the speed increased, as follows:

Mean effective pressure per square inch, 119 lbs., 80, 58.5, 34, while the speeds increased at the same time from 14 to 24, 30, 45 miles. From this it is clear that the total average pressure on the piston decreased in the ratio of 119 to 34 from 14 to 45 miles per hour. Hence the adhesion of the drivers which was utilized in this case must have varied in the same ratio, and if 119 represents the adhesion necessary to prevent the wheels from slipping at starting, then only 34 would be necessary at 45 miles per hour, provided that the adhesion of the rolling wheels does not decrease as the speed increases—and so far as we know it does not decrease sufficiently to require consideration in this argument. It is evident, then, that the total adhesion of the locomotive drivers, when sufficient to prevent slipping at starting a train, is never utilized when the train is at considerable speed. This being the case, and bearing in mind the fact that passenger locomotive drivers make a much greater number of revolutions with the lower mean effective pressure, one must conclude that an express locomotive should be chosen in such a way that it will be working at an economical cut-off when traveling at considerable speed and, therefore, when utilizing a rather small percentage of the adhesion of the drivers. This gives to a locomotive a much smaller cylinder than it would have were it designed to work economically at the start when the total adhesion is being utilized.

With engines in other service the conditions are different, particularly for switchers, pushers on grades, and heavy freight locomotives. With them the average adhesion utilized is a larger percentage of the total, and therefore the mean effective pressure in the cylinder should bear an entirely different ratio to the total weight on drivers.

Let us take an actual case somewhat magnified to show more clearly the point to be brought out. Assume a locomotive required to haul 15 loaded 60,000-lb. freight cars up a  $2\frac{1}{2}$  per cent. grade at 10 miles per hour, to find what is the proper cylinder capacity, and compare it with the cylinder capacity as determined by the rule recommended by the Master Mechanics' Association.

The resistance of 15 loaded 60,000-lb. freight cars—90,000 lbs. total—on a  $2\frac{1}{2}$  per cent. grade would be (due to the grade)  $15 \times 90,000 \times 2\frac{1}{2}$  per cent. = 33,750 lbs.

The resistance due to friction would be 45 tons  $\times 15 \times 7$  lbs. per ton = 4,725 lbs. Hence the total resistance = 38,475 lbs.

A speed of 10 miles per hour corresponds to a speed of 880 ft. per minute. The horse power then necessary to raise this load up the grade is  $\frac{880 \times 38,475}{33,000} = 1,026$  horse power.

The Master Mechanics' Association rule for the proportion of locomotive cylinders to the weight on drivers is

$$W = \frac{0.85 d^2 S P C}{D}$$

In which  $D$  = diameter of drivers,  $d$  = diameter of cylinder,  $S$  = stroke of piston,  $P$  = boiler pressure,  $W$  = weight on driving wheels and  $C$  = 4.25 for freight engines. All dimensions and weights to be in pounds and inches.  $C$  is given in the Master Mechanics' report as  $\frac{1}{4.25}$ , but the formula is not arranged for  $C$  to be expressed in that way; hence,  $C$  must always be taken for use in this formula as equal to 4.25 for freight engines.

Solving this formula for  $d^2$ , it becomes

$$d^2 = \frac{W D}{0.85 S P C}$$

Having a given load to haul up a given grade, the weight of the engine on drivers necessary to haul this load and to haul the locomotive itself cannot be found directly, except by a series of approximations, unless recourse is had to a formula such as the following:

$$W = \frac{C L (f + p)}{1 - C (f + p)}$$

In which  $L$  is the total car load in pounds;  $f$  the rolling friction of the train in pounds per pound of

load;  $p$  the per cent. of grade;  $W$  and  $C$  the same quantities as in the foregoing.

From these formulas are determined directly the necessary weight on drivers to haul the entire train, including the locomotive itself, up the given grade, and also the diameter of the cylinders which would be used on such a locomotive according to the Master Mechanics' rule.

The results are that to do the work called for on the assumed train of 15 cars would require a locomotive weighing 186,000 lbs. on the drivers and a cylinder, according to the Master Mechanics' rule, 24 in. in diameter, the stroke having been assumed at 28 in., the boiler pressure at 160 lbs., and the diameter of the drivers 50 in. The horse power necessary to haul the entire train load, including the locomotive, supposing it to be a saddle tank engine, up the grade is 1,167.

The total resistance of train is 48,770 lbs. To generate this horse power economically, the engine must cut off at an economical point, and as the locomotive is to work under this as an average load, the desired economy can only be obtained when the cut-off is properly arranged under average conditions of operation.

Sixty pounds per square inch is an economical mean effective pressure for 160 lbs. boiler pressure, and the indicator card illustrating this degree of expansion is shown in fig. 1, and is taken from a locomotive in actual operation. The cut-off shown by this card is as long as any engineer would advise if economy in operation is the end sought. Assuming this 60 lbs. then as an economical mean effective pressure, the



Fig. 1.

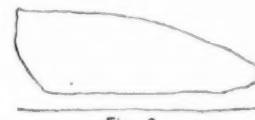


Fig. 2.

necessary area of the cylinder under the conditions above mentioned to generate 1,167 H. P. at a speed of ten miles per hour is 651 sq. in. This area corresponds to about 28½ in. in diameter. Hence, to haul the fifteen loaded cars and the locomotive up a  $2\frac{1}{2}$  per cent. grade with the economy shown by the indicator card, fig. 1, would require a cylinder 28½ in. in diameter by 28-in. stroke. As just stated, the Master Mechanics' rule gives a 24  $\times$  28-in. cylinder. The difference is considerable, as will appear in what follows.

Taking now the 24  $\times$  28-in. cylinder, we may find what mean effective pressure is necessary to haul the given load up the given grade; that is, to generate 1,167 H. P. That pressure is 86.5 lbs. per sq. in. The indicator card which would give this mean effective pressure is shown in fig. 2, and it is difficult to believe that it represents a satisfactory or economical steam engine action.

It would not seem that further discussion of this individual point is necessary, as all know that a cut-off, as shown by fig. 2, is not as economical as that shown by fig. 1, the difference being about 30 per cent. In fact, there are cases where the difference is over 40 per cent. One of the great advantages of this saving is in the reduction of the amount of water carried. Forty per cent. less water means a considerable saving in fuel and inconvenience on mountains where water is scarce. On some mountain grades water has to be carried from the bottom in sufficient quantity for the entire round trip.

All stationary engine builders, in making tests for maximum economy, invariably load the engine in such a way as to gain the most economical cut-off when the engine is doing the average amount of work, and a locomotive is not to be considered as a small engine requiring less scientific consideration of such matters as economical point of cut-off, back pressure and compression, than the stationary engine. Rather it is a very large engine, demanding the most careful attention. Proof of this is found in the foregoing example where 1,167 H. P. is necessary at very slow speeds, and in the higher prices paid for fuel for locomotives than for stationary engines, which reaches in the remote West, for the work we are now considering, \$5, and in some cases \$7 per ton on the tender. Compare this with the cost of coal for the 1,000 H. P. stationary engines which are most carefully designed; the coal used for such is often delivered to the furnaces for prices ranging from \$1 to \$2.50 per ton.

We are not finding fault with any particular design



or type of engine, neither do we wish to throw discredit upon the Master Mechanics' rule for cylinder capacity, but we wish to call attention to the necessary limitations of this rule, which seems to work with perfect satisfaction for ordinary road engines, but which is obviously misleading when applied to powerful pushers and heavy freight engines. The reason of this limitation of the Master Mechanics' rule clearly lies in the differences found in the conditions of operation. That rule is applicable to engines which are called upon to utilize their total adhesion only at starting and accelerating trains, and which utilize only a fraction of the adhesion under the average conditions of operation. In the case of heavy pushers and freight engines a large percentage of the adhesion of the drivers is utilized at all times, and often on grades the entire adhesion is necessary to haul the loads allotted to the engines, the only limit to the loads being the limitation of maximum hauling capacity.

It is quite easy to practically prove the truth of these statements. Let an engine haul up a long grade all the load that it can, and not cut off later after starting than shown by the indicator card; in fig. 1; let the coal be accurately measured, and the amount used per ton of total train load, including the locomotive, be calculated from the result; then let the same locomotive take a heavier load until the cut-off is shown in fig. 2; let the fuel be determined as before in pounds per ton of total train load, including locomotive. A comparison of the results will show beyond question the value of a locomotive designed for the work which it has to do rather than according to some hard and fast rule.

We, of course, realize that there are practical difficulties in the way of using extremely large cylinders, and that care must be taken at starting to prevent inordinate slipping of drivers when large cylinders are used; but any intelligent engineer can control the slipping of drivers, and there need be no large loss from wear of tires due to this cause. So far as the practical difficulties in the way of large cylinders are concerned, they will seem perhaps insurmountable as long as the saving from their use on the class of engines we are now considering is indefinite and not clearly understood; but just as soon as the resulting economy is clearly demonstrated and a good reason is shown for the use of such cylinders, the practical difficulties will fade away as they always have faded when the commercial efficiency of any machine is impeded. Instance the large sized cylinders now used for compound locomotives; the promised saving of 15 to 20 per cent. has driven the objections to large cylinders into the background, and now we notice cast steel pistons 29 in. in diameter which weigh no more than the 19 and 20 inch commonly found on locomotives.

The conclusion then from all this is that heavy freight locomotives, more particularly those used on grades, should be considered as a class by themselves and treated as such, the treatment being based on the well established rules and ratios found necessary in steam engine practice of other kinds. These rules vary but little, whether they be those followed in marine or stationary engine work. The general plan followed is, simply expressed, to find first the work to be done and then to give to the cylinder such capacity as to do the work at an economical point of cut-off.

#### Another Legal Farce.

Henry C. Kemp, the brakeman whose failure to stop a freight train following his was the cause of the rear collision at Shoemakersville, Pa., Sept. 19, which fouled both main tracks, wrecked a passenger train and killed 22 persons, was acquitted by the jury when he was tried on a criminal indictment at Reading last week. The report in the Philadelphia *Public Ledger* says:

"The jury in arriving at its verdict evidently accepted the theory of the defense, that Kemp did not have time to go back far enough to stop the two coal trains from colliding, that the passenger train dashed into the wreck immediately afterwards, and that the disaster was entirely unforeseen and unavoidable."

"The theory of the defense" was doubtless the same in this that it is in other criminal cases; that is, to clear the accused by any possible means. Even if a jury is influenced by no other motive than pity for the prisoner or sympathy for his wife, the "theory of the defense" is satisfied.

If Kemp has thoroughly learned the lesson of this tragedy every humane person, thinking simply of him, will be glad to see him free; but the vital point in this case is that justice has failed, and a great crime has taught no effective lesson. We do not know but that the evidence given before the coroner's jury to the effect that the freight trains were 12 minutes apart, and that there was ample time for flagging, has been actually weakened and that the condemnation of Kemp on the strength of it was wholly or partially

unjust; but that would merely shift the responsibility; it would not abolish the crime. If Kemp did not go back when he had time to do so he was at fault; if there was not time, the engineer of the following train was, *prima facie* at least, blameworthy for running too fast, or some station man was at fault for not warning him. If the well known rules providing for these safe guards were not in force on this road, the officers were at fault. If stations were so far apart, or the difficulty of controlling the speed of trains was so great as to make the time-interval system of running one train behind another unreliable, and to make a space interval system necessary, the burden of explaining the disaster again falls upon the management. Whichever way we look at it some man or men failed in a plain duty; and yet the law has tried to punish only one man, has failed in the attempt, and we shall probably hear no more of the case.

It is true that the railroad company may suffer pecuniarily, but what, then, becomes of the criminal law? The law is intended to punish not merely a class—and the class with which juries are most likely to sympathize—but to rest with equal weight on all who are guilty. If Kemp has been unjustly acquitted, the state should move for a new trial. If the state ought to have got indictments against an engineer, an operator, or a superintendent instead of a brakeman (or against all of these in addition to the brakeman) there is need of a railroad commission or other expert body in Pennsylvania to instruct the state's attorneys. If criminal laws are to do any good by giving warning lessons for the future, they must be persistently enforced. If the pecuniary punishment of the railroad company is to remain the only practicable remedy for collisions causing death, let us have done with worrying wretched trainmen and telegraph operators by a process which always ends in a way that encourages contempt for the law. Several other prosecutions of this character are now pending, but if they are destined to simply waste money, they may as well be dropped at once.

In speaking last week of the case of brakeman Aulman, who went unpunished because he had no book of rules, we omitted to state that his regular position was that of front brakeman, and that he was at the rear temporarily by reason of the tail-end man having dropped off earlier in the trip. This partially explains why he had no book, the tendency to regard the rear brakeman as more important than the others being common. But it does not explain the strange negligence of officers in making rules which demand intelligent behavior on the part of all the men on a train, and then making up crews on the theory that one man with brains can make up for the lack in the others. Nothing is more evident than that the front brakeman must often take the place of the rear man, if the rules are to be carried out; and it is one of the most palpable blunders to provide one brakeman with printed rules and expect another to do equally good service with only oral instruction; but this is just what is often done. The conductor is told in effect: Part of the time you must protect your train by sending a man to whom the company has given considerable careful instruction, and part of the time you must do it by means of a green hand. What road can depend upon one-fourth of its freight conductors to uniformly carry out the rules under this condition of things? Is it not better—is it not simple common sense—to train all the brakemen as though they were flagmen?

#### An English Report on the Wabash.

On June 30 last the reorganized and reunited Wabash Railroad finished its first fiscal year. Interest was paid on the first and second mortgages and on the income bonds called Series A. The report of the company gives many interesting items of information about the operation of the road during the year, but unaccountably omits the details of the operating expenses.

The English holders of Wabash securities and stock apparently were not satisfied, for on their order Mr. Hermann Landau sailed from England on Oct. 3 to examine the affairs of the road and to report upon the advisability of building the proposed road from Chicago to a point on the Detroit line, about 100 miles west of that city. Nov. 18 Mr. Landau made his report to the London provisional committee, including in it an estimate of the earnings and expenses of the traffic on the Detroit-Chicago division for the year, made by a Chicago accountant, who spent two days in the Wabash general office under instructions from Mr. Landau as to methods of estimating items. The report and estimate are curious, as showing how a man, however familiar with English railroads, can make blunders in giving opinions on American roads.

There are two ways of estimating the earnings of a part of a large system. One is to find the gross earnings of such part and apply the average operating expenses, thus leaving the net. The other method is to dissect the ac-

counts so that the exact sums of earnings and expenses of the line in question can be ascertained by items, the net thus being known to some degree of accuracy. The accounts of the Wabash were not kept with reference to the Detroit-Chicago traffic separately, hence the accurate net earnings could be known only by careful study on the part of some one very familiar with the conditions. The London plan was neither of these, but half way between. This plan estimates the Chicago traffic as less than half the whole division earnings. The President of the Wabash says this is much too low, no particulars being given on either side. Next the Chicago terminals, the rentals and maintenance due the Chicago & Erie (the present Wabash connection), and the cost of train service on that road, are charged against estimated earnings, and in addition the operating expenses of the Wabash for through and local business based on the operating expenses for the whole road. President Ashley objects to charging Chicago station expenses and similar items in a lump sum, while estimating operating expenses on the basis of total expenses, which include those items. No particulars are given either in the London report, the President's protest or in the annual report to stockholders, but a reading of Mr. Landau's "approximate statement" leads to the conclusion that for its purpose it is practically worthless, and that the method suggested of applying the general operating percentage of the road to this particular traffic is—if we are to rely on very crude figures—a better plan than the one presented.

The point will be at once seen when it is stated that the London estimate shows a deficit under operating expenses of \$2,800, while the application of the average percentage of expenses shows net earnings of \$220,000. The subject being the advisability of building a new line at \$3,500,000, or, say, at annual fixed charges of \$200,000, the way the estimate is figured makes a big difference.

The text of Mr. Landau on this point is very curious, to say the least: "I am constrained to state that the local business of the road is not sufficiently cultivated, as indicated by the fact that during last year no less a sum than \$350,000 on balance was paid by the Wabash for cars of foreign lines on their system, and that it would be infinitely more profitable to provide ample cars for coal and other traffic, for which there is a great and constant demand, than to incur a debt of \$3,500,000 in building a line of very doubtful advantage or to go in for competitive through traffic at rates which result in abstracting much of the profit obtained from local business." One is at a loss to follow this reasoning, if indeed there is any connection between the parts. The Wabash, like all roads, had an unusually heavy traffic in corn and other commodities and borrowed cars to move it. Would any one have seriously advised the road to miss the profit on the increase or to spend large sums for new cars (even if they could have been built in time) which might stand idle next year? And how does the car mileage balance indicate a neglect of local business? As far as the two things have any connection at all, the liberal supply of cars proves just the contrary.

A good railroad opinion would have had more than a passing allusion ("very doubtful advantage") to so important a question (about which the London committee sent the representative here) as the building of an air line to Chicago. It is reasonably certain that the Chicago & Erie will, in the end, succeed in throwing the Wabash off its line; the latter is only fighting for time. What then will the Wabash do? It gets via Detroit very little Chicago business to or from the Grand Trunk, that company having a line of its own. The trouble arises from the traffic alliance between the Wabash and the Canadian Pacific. The latter very enterprising corporation has reached Detroit and must have a Chicago connection. The opposition of the Erie to the use of its line into Chicago by the Wabash arises from the proposed sub-use of its Chicago line by the Canadian Pacific. If, now, the Wabash does not give to the Canadian Pacific a chance to compete for Chicago traffic, that company will find some other connection, and the Wabash will lose not only the prospective Chicago business of the Canadian Pacific, but all that road's St. Louis and Southwestern traffic as well. Here is really the kernel of the question. It should also be remembered that large expenses now yearly paid by the Wabash for terminals at Chicago and Detroit, and for belt lines, must continue to be paid whether the proposed line is built or not. Hence any estimate about the new road which includes these items in whole, or even in part, must be theoretical merely, because no additional expense in those departments would be necessary in actual operation.

Assuming the necessity of a Chicago line, the question then would be whether the Wabash should build its own line or make an alliance with the Baltimore & Ohio. That line has but a single track, already crowded. It could accommodate the Wabash only by building a second track, which the Wabash would have to pay for directly or through annual interest. It is a question whether its own line, built to suit its needs, and managed in its own interest, would not be preferable; and this in spite of the general opinion that no more competing roads should be built.

Space forbids following Mr. Landau's vagaries further in detail. He seems to think that the Wabash ought to



get St. Louis and San Francisco rates, or that it ought to put up its local charges in some unexplained way. He denounces American methods generally. He makes a strange blunder in saying that the majority of the Wabash bonds and stock is held in England (corrected by President Ashley), and so reasons that a combined effort abroad will "bring about a better state of affairs." He asserts that the President and Directors do little more than attend meetings at \$10 each, and seems to hold the Wabash responsible for ticket scalpers. He intimates that the Wabash officers are themselves rate-cutters. It will be seen that Mr. Landau's comments upon our general railroad problem are very crude indeed, while, as a report from which a foreign holder could get anything definite about the Wabash Railroad and its best policy, it is nearly if not quite worthless.

Two men and two boys were killed and two men injured at a highway crossing of the Pennsylvania road in Bristol, Pa., on Saturday of last week. One of the men killed was a pedestrian who happened to be near the crossing, but all the other victims were in a market wagon which was driven upon the crossing directly in front of a fast southbound express train. The cause of the accident seems to have been two-fold; first was the usual circumstance of a freight train going in one direction, and the driver assuming, as soon as it had passed, that all the tracks were clear; second, the gate tender failed to keep the gate down for the express train, for the reason, as stated by him, that the electric bell which should have warned him of the approach of the express failed to ring. Further particulars than those now published may slightly modify the relative importance of different elements in the cause as a whole, but we mention the case to call attention to the statement concerning the failure of the mechanical warning. There are experts who distrust all such mechanical or electrical warnings and persistently act in accordance with their theory, and the present instance is one of the class which they bring forward to justify their position. A mechanical device which will never fail is hardly claimed to exist (except by the vendors of devices which are so defective in principle or construction that no one is at all inconvenienced by the amount of time or thought necessary to expose the lie); but the question then arises, must we wholly ignore all mechanical safety devices, except those which, like the automatic brake and the counterweighted semaphore arm, will "always take the safe course" when they give out? So far as this particular problem is concerned, it is not mechanically impossible, and probably in hundreds of cases not financially impracticable, to provide an electrical warning for gate or bridge tenders which shall give some sort of intimation of a break in the conductor, fusion of magnet coils and other classes of trouble; but the immediate question is whether, in spite of this fact, there is not still a field for simpler and cheaper devices. To put it in a concrete form, is it not better to equip 50 crossings with a bell which will fail (dangerously) once a year than to equip only 25 with a device which will dangerously fail but once in five years? The automatic air brake "tells on itself" in almost every contingency, but it does not promise to stop the train when a ghost jumps up from the track and shuts the cock just behind the tender; and yet no one has deemed this remote danger of sufficient importance to provide a wrought iron hood for every cock in the train pipe. Similarly with electric bells; if a bell will jog the memory of a careless or sleepy gate tender a dozen times a year, ought it not to be used in spite of its own rare failure? The degree of infrequency of these failures, and the success with which the attendant trains himself to treat the bell as an adjunct and not as the prime mover in the duty of protection, of course come in here as vital questions, and make the problem one which must be settled in each case on its own merits; but they still leave it a live question. It cannot be settled by one failure like that at Bristol.

The National Electric Headlight Co., of Indianapolis, has received an order from the Cincinnati, Hamilton & Dayton to equip all its passenger engines with electric headlights. This is the result of a test which has not only extended over several months but is of interest as being on a road which is partly double track. Electric headlights have also been placed upon the engines of the Louisville, New Albany & Chicago, which haul the "Electric" train of the Monon route between Chicago and Cincinnati, this train therefore being now hauled all the way by engines having electric head lights. Ten passenger engines on the Vandalia line have been equipped with this headlight, and solid trains are running between Cincinnati and St. Louis via the Cincinnati, Hamilton & Dayton and Vandalia lines which are pulled all the way by engines equipped with the electric light. In addition to this, the light is in use on the Indianapolis, Decatur & Quincy, the Wabash, the Lake Erie & Western, and a number of other railroads in the West. Many instances of the practical utility of the headlight have already occurred and only a few nights since, on the Indianapolis, Decatur & Quincy near Tuscola, Ill., a collision was avoided by its use. Some freight cars were blown from a siding to the main track during a windstorm but the engineer saw them in ample time to stop. Some of the remarkable characteristics of this light have been heretofore described in the *Railroad Gazette*. An additional one mentioned by engineers is

that it has the effect of intensifying rather than obliterating switch lights. This tends to weaken the theory that the light is so intense as to render colored lamp signals valueless. A representative of the *Railroad Gazette*, in traveling through the districts where the light is most used, has talked with engineers on the subject and has invariably found them enthusiastic. One man said that rather than be without it he would bear the expense of equipping his engine personally. The mechanism of the lamp has been so simplified that an engineer can master it in a few minutes.

The fact that one takes more or less chances when he submits any kind of a technical question to the courts for decision is illustrated—in a way which will seem somewhat ludicrous to operating officers—in one of the decisions (the 16th) printed in our railroad law column in this issue, where the Supreme Court of Texas assumes that the proper way to run work trains by telegraphic orders, where freight trains are liable to come over the road, is to order both of the two opposing trains to keep their speed under control. It does not appear whether this assumption was allowed to finally settle the case, but enough is told to show that such a thing as running regular trains at regular speed and requiring the irregular train to do all the looking out—as is done in thousands of cases daily—has never occurred to the mind of the court, even as a possibility. The Supreme Court of Minnesota (in the 18th decision) gives us a point on the question of employer's liability, a subject which is now of growing importance. In this week's batch of decisions, as well as in numerous previous ones, the definition of "fellow servant" is shown to have received various interpretations in different states, and anything like a generally accepted limit to the term seems to be yet far in the future; but the Minnesota court makes a distinction which is quite radical. If it holds good, it will probably multiply the amount of legal wrangling by a considerable figure, as many injuries to employes are in shops, etc., where the conditions are not essentially different from those in a great variety of other businesses besides railroading.

Railroad Commissioner Colvin, of Oregon, has published a letter in reply to that of Manager Koehler, of the Southern Pacific, who discredited the conclusions of the Commission on the causes of the wreck of a passenger train at Lake Labish, as reported in the *Railroad Gazette* of Dec. 5 and previous issues. Mr. Colvin says that the officers of the road were prompt in circulating the story that a clawbar and wrench had been stolen from the tool house at Salem, but that the section master failed to identify the tools found at the wreck. He asks some unanswerable questions concerning the circumstances of finding the misplaced rail, and says that it is strange that the alleged train wrecker "should go 600 ft. out on the trestle to a point just where the rotten bents commenced and the new bents ended." It appears that the bridge had been rebuilt a part of the way. He says that the Commission, on its annual inspection a year ago, recognized the poor condition of this trestle, but saw a large force of men at work on it, and, on the assurance of the Manager that it was being properly repaired, made no official inspection. On that same trip another trestle was condemned and ordered repaired, "but it stands rotten and unsafe to-day."

The Western New York Car Service Association, at its annual meeting in Buffalo last week, voted to abolish the quarterly meetings of the executive committee and to extend the jurisdiction of the Association to additional stations, in accordance with the decisions of the various roads. Mr. C. W. Bradley, General Superintendent of the West Shore, was re-elected chairman of the Executive Committee, and the manager's salary was increased. The average detention of cars during the month of November was 1.98 days. Manager Van Etten in his report says:

On June 1, 1890, the territory was enlarged from 22 reporting stations to 76, and with additional territory added will on Jan. 1, 1891, number 123 stations. The additional territory will add but little to the monthly expenses of the Association. After considerable study we have put in use an entirely different office record from that formerly used which will enable the office to give at a few minutes' notice the amount of car-service earnings at any station up to the date of the last report from the agent, thus enabling auditors to include car-service earnings when checking up a station. This information can be obtained on request by wire or letter. The future success of the Association will depend upon prompt and proper reports from agents, and also upon carrying out the past policy of treating shippers and consignees in a liberal spirit after the rules have been lived up to by them and by the agents.

Amid a great variety of rumors concerning the reduction of expenses and economies of various sorts on the Union Pacific, in consequence of the change of management, a few actual facts crop out. One of these is the announcement that the freight soliciting office of the company in Philadelphia will be discontinued at the end of this month. Probably some other Eastern cities will be treated in the same manner. A Portland (Or.) paper states that the agents of half a dozen roads in that city, who have heretofore borne the expense of telegrams sent by their customers ordering goods from Eastern cities, have been ordered to stop such payments. The roads named are the Union Pacific, Northern Pacific, Chicago, Rock Island & Pacific,

Chicago, Burlington & Quincy, Chicago & Northwestern and Great Northern. The Union Pacific's reduction of forces in shops all over the system has been supplemented by similar action in the road department. A Texas paper says that two-thirds of the trackmen on the Texas division of the Union Pacific, Denver & Gulf have been discharged, 200 men in all.

If Judge Gresham's ruling in the Counselman case is sustained on appeal—and the probabilities are that it will be—granting special rates will become a more dangerous thing than it now is. The ruling practically says that if any person dealing with a railroad shall turn state's evidence, he shall be promised immunity from prosecution. But it is not likely that much will be accomplished in this way. Over and over again there have been attempts to make legislative bribery dangerous in precisely the same way; yet the practice has gone on in very much the same fashion as before. The indirect results to a man who gives evidence of this kind are so bad that he is rarely willing to do it; and an unwilling witness, in a complicated case, is a pretty awkward customer to handle.

The railroad committee of the Canadian privy council has just rendered a decision in which the general principle is laid down that when two railroads use the same highway crossing the companies and the municipality shall each contribute one-third toward the cost of protection. When the dispute is between the municipality and one railroad company each shall pay half the cost. This decision has arisen out of the applications of the corporations of Toronto and Hamilton for protection to grade crossings within their corporate limits.

#### NEW PUBLICATIONS.

*Registration of Correspondence.* A new system applicable to large offices. By R. W. Lapper, Box 2,071, New York.

This copyrighted system which is used in many English and some American railroad offices involves no special or expensive furniture—nothing but index registers, a consecutive numbering and dating hand stamp and storage pigeon holes. It is worthy of attention, for it renders all letters instantly available for any number of years back, and it involves but little clerical work.

Mr. Leo. von Rosenberg, 35 Broadway, New York City, announces for publication *The Washington Bridge over the Harlem River, a Description of its Construction.* By William R. Hutton, Chief Engineer; illustrated with 26 albertypes and 37 double and single page lithographs. The price of the work has been fixed at \$8. It was originally announced at \$5, but the greatly increased size to which it has grown and the expensive illustrations have made it necessary to raise the price. It will be a quarto volume of 100 pages and the subject will be covered thoroughly. The illustrations have been prepared with great care and are very handsome. The lithographs are made from line drawings, showing the construction in great detail from the foundation up, including an interesting sheet showing to one scale five of the largest metal arches ever built.

#### A "Collision Epidemic" in England.

Unless our leading railway companies can manage their business better than has been the case of late they will find themselves confronted by an agitation demanding legislative interference that may involve them in serious expenditure. People are getting right down sick of reading about accidents on railways. Scarce a day now passes without some disastrous collision being reported from some part of the kingdom. Last week alone has witnessed three such accidents, and that at Taunton entailed calamitous loss of life. When accident after accident occurs in this fashion the public cannot be wrong in contending that screws are loose somewhere. We are popularly supposed to have the block system at work upon our roads and to possess almost perfect brakes; but these have not brought immunity from mishap. It is currently believed, indeed, that, in comparison with the steadily growing dimensions of their business as carriers, most of our railways are seriously undermanned, and that very large sums will have to be spent before the block system is adequately enforced throughout the United Kingdom, and really efficient brakes provided on all trains. Expenses have already risen to a pitch which makes it improbable that the companies can maintain dividends. . . . Very little is needed to work the public mind up to a demand for drastic and costly reforms, notably shorter hours for employes, the effective establishment of the block system, and the application of automatic brakes to every train, passenger or freight. . . . Railway stocks may therefore become seriously depressed.—*Financial Times (London).*

#### Canadian Canals.

The Minister of Railways and Canals has ordered a survey for the enlargement of the Farran's Point canal, above Cornwall, Ont., to the standard of the St. Lawrence system. The canal, which is one and a half miles long, will be widened to 90 ft. The estimated cost of the work is \$750,000.

#### Burning of Repair Shops.

The old workshop of the London & Port Stanley road at London, Ont., was burned last week. It was owned by the city, but the Grand Trunk, as lessee of the road, had a number of trucks, etc., stored in it and used a part of the building for repairs.

#### LOCOMOTIVE BUILDING.

The New York, Providence & Boston has recently received a large 10-wheel freight engine from the Manchester Locomotive Works. The following are some of



the general dimensions: Cylinders, 19 x 26 in.; drivers, 5 ft. 3 in. diam.; truck wheels, spoked, steel tired, 28 in. diam.; driving wheel base, 15 ft.; total wheel base of engine about 25 ft. 6 3/4 in.; boiler, 56 in. diam., with wagon top; fire-box, 78 1/2 in. long x 35 1/2 in. wide; weight, about 110,000 lbs. The engine is equipped with the New York Air Brake Co. driver brake.

The Rhode Island Locomotive Works have orders for 10 eight-wheel engines for the New York, New Haven & Hartford, with 18 1/2 x 24 in. cylinders, built to railroad company's specifications, and for six four-wheel switching engines for the Boston & Albany, with 16 x 24 in. cylinders, built to railroad company's drawings and specifications.

The Missouri, Kansas & Texas has placed an order with the Baldwin Locomotive Works for 25 mogul locomotives.

H. K. Porter & Co., of Pittsburgh, Pa., have contracts for 30 new engines of standard and all sizes of narrow gauges. Two small engines for the Irwin's mine, in South America, are about completed, and also a new shifting engine, for the works of Carnegie, Phipps & Co., at Beaver Falls. An uncoupled motor has been shipped to the Milwaukee & Whitefish Bay Railroad. It has four driving wheels and a four-wheel rear truck, and weighs 23 tons.

The Wheeling Bridge & Terminal Railway Co. has ordered four more locomotives for its Wheeling terminals of the Baldwin Locomotive Works.

#### CAR BUILDING.

The 5,050 cars recently ordered by the Philadelphia & Reading will all be equipped with the Van Dorston automatic coupler made by the Van Dorston Cushioned Car Coupling Equipment Co. of Philadelphia. The cost of equipping these cars with the couplers will be \$126,500. The cars will also have air brake equipment. They are being built by the Pullman Car Co., and will include 3,000 thirty-ton coal cars, 1,000 gondolas, 1,000 box cars and 50 stock cars. The delivery is to begin about the first of next year. About 1,000 are to be delivered by Feb. 1, and the remaining 4,050 by Aug. 1. The rolling stock will cost over \$2,500,000. The 4,500 new cars added last year also had the Van Dorston coupler.

The St. Louis & Eastern road will soon place orders for a number of coal cars.

The Lehigh Valley has divided its order for 2,000 coal cars with the following three companies: Pardee, Snyder & Co., Limited, of Watsonstown, Pa., and Jackson & Woodin Manufacturing Company, of Berwick, Pa., 500 each; McKee, Fuller & Co., of Catasauqua, Pa., 1,000 cars.

The Boston & Maine is preparing specifications for 50 passenger cars to be delivered before next June.

Patterson & Corbin, street car manufacturers of St. Catharines, Ont., are manufacturing 12 cars for the new Ottawa electric street railroad. The firm has received orders for larger cars from New Westminster, and is bidding on cars for St. John, N. B., Kingston, Galt and Preston, Ont., and Winnipeg, Man.

The Huntington & Big Sandy road, now building, will soon order two passenger and two combination cars and a number of freight cars.

The Cleveland, Akron & Columbus is to order new freight equipment.

There have just been built at the Aurora shops of the Chicago, Burlington & Quincy two coal cars, constructed from the designs of the Harvey Steel Car Co.

The new shops of the Nashville, Chattanooga & St. Louis at Nashville, Tenn., has just completed 30 coal cars for the road.

The Barney & Smith Mfg. Co., of Dayton, O., is building several parlor chair cars for the Atchison, Topeka & Santa Fe for service on its Colorado lines.

#### BRIDGE BUILDING.

Anderson's Mill, S. C.—Bids are being invited for the construction of a bridge over the North Tyger River, near this place.

Burlington County, N. J.—The contract for building the drawbridge over the Mullica River, at Chestnut Neck, has just been let to Dean & Westbrook, of New York, for \$38,500. The bridge will be 750 ft. long, of four spans of 150 ft. each, with a draw span of the same length. The superstructure will be of iron and steel. Work will be commenced next April.

Chattanooga, Tenn.—The iron bridge of the Nashville, Chattanooga & St. Louis Road over Chattanooga Creek, at the base of the mountain, is to be removed, and a new and larger iron bridge constructed in its place, to bear the heavier equipment being received.

Denison, Tex.—One span of the Missouri, Kansas & Texas Railroad bridge over the Red River, three miles north of this place, which is being built to replace an old wooden one, which was declared to be unsafe, has been completed, and the caisson for the next pier is ready for the stone work. The new bridge will be 4 ft. higher than the former one, and will have three instead of five spans.

The Missouri, Kansas & Texas has agreed to pay one-third the cost of erecting a viaduct over its tracks at the foot of Gandy street. One-third is to be paid by the Houston & Texas Central, and one-third by a local street road. The proposition was accepted, and the right of way granted. It is estimated that the viaduct will cost about \$16,000.

Grenada, Miss.—A contract is soon to be let by J. C. Thomas for the construction of an iron bridge over Yalobusha River at Horton's bridge.

Hamilton County, O.—Sealed proposals will be received at the office of the Board of County Commissioners until Jan. 17, for the following county work: Iron girder bridge over the Miami Canal on the Carthage pike at St. Bernard, Millcreek Township; excavation and masonry of bridge over the Miami Canal on the Carthage pike near St. Bernard, Millcreek Township. The work to be done according to plans and specifications on file in the office of the County Commissioners at Cincinnati.

Hancock County, W. Va.—The County Court has asked for bids for building a 150-ft. roadway steel bridge over Buffalo Creek at a point near the Ohio River.

Hot Springs, Ark.—The city council of Hot Springs has voted an appropriation of \$5,250 for the extension of the Creek Arch Bridge.

Niagara Falls, Ont.—Mr. G. M. Clark, solicitor for the Canadian Pacific, has made application for an act to incorporate the Ontario & New York Bridge Co., with power to construct a bridge for railroad and other purposes across the Niagara River near the town of Niagara Falls.

poses across the Niagara River near the town of Niagara Falls.

Orangeville, Md.—A bridge to cost about \$24,000 is to be constructed by a company formed by John Glenn, of Baltimore, and others.

Ottawa, Ont.—A new bridge will be erected over the Nation River, near Ottawa, during the winter, which will cost between \$3,000 and \$3,500. The plans are now in the hands of Z. Therien, contractor.

West Shenandoah, Va.—An iron bridge across the Shenandoah River is to be constructed by the West Shenandoah Land Co., of Shenandoah, the contract for which will be awarded shortly.

Wheeling, W. Va.—The Baltimore & Ohio and Pittsburgh, Wheeling & Kentucky, whose tracks are very close together at Wheeling, W. Va., have commenced the erection of a double track plate girder bridge over Caldwell's Run. It will be 30 ft. high, and have a 60-ft. span.

The Baltimore & Ohio is replacing its cast-iron girder bridge built in 1852 over Wheeling Creek, at Wheeling, one span of which fell three weeks ago, with a new steel plate-girder bridge.

#### RAILROAD LAW—NOTES OF DECISIONS.

##### Powers, Liabilities and Regulation of Railroads.

In North Carolina the Supreme Court rules that under the section of the United States Constitution, authorizing Congress to regulate commerce among the several States, the rolling stock of a foreign railroad company which is used in interstate commerce is not subject to taxation in North Carolina.<sup>1</sup>

In the Federal Court it is held that the shipment of merchandise from one state to another is interstate commerce, and any requirement of a state statute in respect of such commerce in conflict with the requirements of the interstate commerce act is invalid.<sup>2</sup>

In Texas the Supreme Court rules that the state statute which forbids railroad companies to use or occupy any part of the right of way over which their respective roads pass for any other purpose than the construction and keeping in repair of their roads does not apply to land owned by a railroad in fee, although its road is built thereon.<sup>3</sup>

The Supreme Court of Missouri holds that although the state act of 1868, known as the "Township Aid Act," has by this court been held to be unconstitutional, yet, as the federal courts uphold the act, bonds issued under it are proper subjects of compromise, and a tax levied to pay such compromise bonds issued under the act of 1879 is valid.<sup>4</sup>

In the Federal Court an Arkansas railroad, owning a road in Arkansas, consolidated with a Missouri company owning a road in the latter state, and the consolidated company executed a mortgage on the road in both states. The Court holds that, by the consolidation, the new company became the owner of the road in both states, but was to be regarded as an Arkansas corporation in Arkansas, and as a Missouri corporation in Missouri; and, on foreclosure of the mortgage in Arkansas, it was proper to describe the defendant in the bill as a corporation created by and existing under the laws of Arkansas, and a resident and citizen thereof.<sup>5</sup>

##### Carriage of Goods and Injuries to Property.

In Georgia in an action against a railroad for the loss of a bale of cotton, plaintiff's evidence showed that the bale was loaded on a dory to be delivered to defendant, and that defendant's check clerk had signed a receipt for the bale in the drayman's receipt book, but that the receipt had been erased. Defendant's check clerk testified that he had signed the receipt, but, on being informed by the head clerk that he had made a mistake, he erased his signature. Defendant's head clerk testified that, in billing out the cotton in the depot for shipment, he had been unable to find the bale in question; that he then directed the check clerk to mark off his receipt for the bale; and that, had the bale been received, witness would have discovered it when he billed out the cotton. The Supreme Court holds the railroad liable.<sup>6</sup>

In the Federal Court it is held that a railroad receiving and issuing bills of lading for goods cannot excuse delay in transportation occasioning such accumulation of dangerous materials as creates a nuisance on the ground of an unexpected press of business.<sup>7</sup>

In North Carolina in an action for a statutory penalty for not shipping goods within five days, the railroad denied receiving the goods. Plaintiff testified that he carried a bale of cotton to defendant's warehouse, and found the agent and one R. in the office; that, when he told what he wanted, R. went with him, and weighed the cotton; that they then returned to the office, and R. gave him the bill of lading in the agent's presence, with the signature of the agent "per R." He also testified that R. had been in the office several months; that he had seen him handling and delivering freight, and that 11 days after the cotton was deposited, he found it had not been shipped; and that the agent cursed and abused R., saying it was the third time he had done so that fall. The Supreme Court holds the delivery proved.<sup>8</sup>

In Wisconsin the Supreme Court rules that an unnecessary delay of 10 or 15 minutes by a landowner in making an effort to extinguish a fire set by the engine of a railroad company on its right of way does not warrant the court in directing a verdict for defendant in an action for the loss occasioned by the spread of the fire, where there is evidence that the landowner could not have arrested its progress had he acted with the utmost promptness.<sup>9</sup>

In Iowa the Supreme Court rules that under the act of 1884 authorizing railroad companies owning a completed road to condemn lands "for necessary additional depot grounds," upon procuring a prescribed certificate from the railroad commissioners, such commissioners have authority to grant a certificate for the condemnation of land for depot purposes at a place where the railroad company has no depot, and owns no land other than the right of way on which its road is built.<sup>10</sup>

In Pennsylvania the Supreme Court holds that the lessee of a wharf, which by the lease could be used only for receiving and storing coal, on the question of damages sustained by the appropriation by a railroad of a strip of the land thus dividing and partially destroying his sheds and appliances, and making necessary a bridge and an increased height in the structures, may show the cost of the new appliances, and also the increased cost of raising the coal and the greater breakage and waste in handling it.<sup>11</sup>

##### Injuries to Passengers, Employees and Strangers.

In New York the Court of Appeals rules that the porter of a sleeping car on a passenger train, who is

hired and paid by the sleeping car company, in respect to his dealings with passengers is the servant of the railroad company, which is responsible for his acts to the same extent as if he was directly employed by it.<sup>12</sup>

In Mississippi the plaintiff, a man of 65, on a dark and cold night, after waiting in the snow and becoming benumbed, attempted to board a moving train; with a valise in one hand, he seized the railing with the other, and attempted to leap upon the platform, but missed his footing, and was dragged 150 yards, during which time he held on to the valise. The Supreme Court holds that plaintiff was guilty of such contributory negligence that he could not recover.<sup>13</sup>

The Supreme Court of New York rules that a provision in a Pennsylvania statute that no common carrier shall do certain acts, and that for a violation of such provision the offending carrier shall be liable to the person injured in damages treble the injuries he may have sustained, makes the statute penal, and it cannot be enforced in the courts of New York.<sup>14</sup>

In Massachusetts a passenger found the car full, and attempted to pass to the next car. The distance between the platforms of the two cars was about 6 in., and there was nothing to prevent her from stepping from one platform to the other; but, without looking, she placed her foot on the buffers just as the train started, and her foot was caught and injured. She had been lame for many years, and had often traveled on this train. The evidence also showed that the train started with a jerk, and did not stop as long as usual at that place, but the train had no fixed time to stay there, or for leaving. The Supreme Court holds that plaintiff was guilty of contributory negligence.<sup>15</sup>

In Texas the plaintiff was injured in a collision between a special freight train and a working train. The freight train had orders to look out for the working train, but the latter, although it was all the previous night at a telegraph station, had no such orders in regard to the former. The Supreme Court holds that the neglect of the defendant's superintendent to give such orders was the negligence of the defendant, imposing a liability on the latter if the injury resulted therefrom.<sup>16</sup>

In New York an employee of defendant was injured while uncoupling cars by falling into a pit between the tracks. The pit was usually covered with planks, but on the preceding day, in order to fix machinery therein contained, other workmen had taken up the planks and neglected to replace them. The Court of Appeals rules that this was negligence of co-servants, and plaintiff cannot recover.<sup>17</sup>

In Minnesota the plaintiff was employed by a railroad in repairing a drawbridge on its road. The draw was open, and being left unfastened by the negligence of one of plaintiff's fellow-servants it was blown shut and injured plaintiff. Gen. Laws Minn. 1887, c. 13, makes railroads liable to an employee for injuries caused by the negligence of a fellow-servant. The Supreme Court holds that this statute applies only to hazards peculiar to the operation of railroads, and hence plaintiff cannot recover.<sup>18</sup>

In Utah the Supreme Court rules that a brakeman is not a fellow-servant of a car-inspector, as they are not associated together in their labor, and are under different managers.<sup>19</sup>

In Texas the Supreme Court rules that a road-master in charge of a working train and a working party, with power to employ and discharge the men, is a fellow-servant of a section hand riding thereon under his direction, but not employed under the immediate eye of the road-master, and the latter cannot recover for an injury received in a collision caused by the road-master's negligence.<sup>20</sup>

In Mississippi the Supreme Court holds that a section master employed by a railroad company, and a section hand working under him, both of whom are engaged at the same manual labor, are fellow-servants.<sup>21</sup>

In Texas the Supreme Court rules that it is not an error to refuse to instruct that a recovery will be precluded by a failure to look and listen before attempting to cross a railroad track on a much-used thoroughfare in a populous city.<sup>22</sup>

In North Carolina, in an action for injuries received at a crossing, the evidence for the plaintiff showed that upon another company's track, which ran parallel with that of defendant, cars were standing over the passway, so that plaintiff could not see the approaching train until he had gone round the end thereof, but that after doing so, although there was a clear space of 6 ft. before reaching the defendant's track, he did not stop or look up. The Supreme Court holds the company not liable.<sup>23</sup>

In the same case the same court rules that where an idiot is crossing a railroad track, and is seen by the engineer of an approaching locomotive in time to stop his train, there is no presumption of negligence in not doing so, unless it is shown that the engineer knew him to be an idiot, and with proper care might have recognized him.<sup>24</sup>

In Massachusetts, on one side of defendant's railroad track were chemical works, surrounded by a fence, in which, opposite to a public road leading to defendant's station on the other side, was a gate, with a lock, marked "No admittance." Between the road and the gate the chemical company maintained a crossing for the convenience of its customers, and with the defendant's license. The works were also reached by an overhead bridge for the use of the public. Plaintiff was injured by defendant's cars while returning from the chemical works by way of the gate, which he found open. There was no evidence that defendant was negligent after it had discovered plaintiff on the track, nor that there was such a general use of the crossing by the public as would charge defendant with notice thereof. The Supreme Judicial Court holds that the railroad was not responsible.<sup>25</sup>

<sup>1</sup> Bain v. Richmond & D. R. Co., 11 S. E. Rep., 311.

<sup>2</sup> Baird v. St. Louis, I. M. & S. Ry. Co., 41 Fed. Rep., 592.

<sup>3</sup> Calceian L. Co. v. Harris, 13 S. W. Rep., 453.

<sup>4</sup> State v. H. & St. Joe R. Co., 13 S. W. Rep., 505.

<sup>5</sup> Central Trust Co. v. St. Louis, A. & T. Ry. Co., 41 Fed. Rep., 720.

<sup>6</sup> Savannah, F. & W. R. Co. v. Steinger, 11 S. E. Rep., 236.

<sup>7</sup> Marines, Ins. Co. v. St. L. I. M. & S. R. Co., 41 Fed. Rep., 643.

<sup>8</sup> Harrell v. W. & W. R. Co., 11 S. E. Rep., 236.

<sup>9</sup> Mills v. C. M. & St. P. R. Co., 45 N. W. Rep., 225.

<sup>10</sup> Jager v. Dey, 45 N. W. Rep., 391.

<sup>11</sup> Schuykill River E. S. R. Co. v. Kersey, 19 Atl. Rep., 553.

<sup>12</sup> Dwinelle v. N. Y. Cent. R. Co., 24 N. E. Rep., 319.

<sup>13</sup> McMurtry v. L. N. O. & T. R. Co., 7 South. Rep., 401.

<sup>14</sup> Langdon v. New York, L. E. & W. R. Co., N. Y. Supp., 216.

<sup>15</sup> Snowdon v. Boston & M. R. Co., 21 N. E. Rep., 49.

<sup>16</sup> Galveston, H. & S. A. Ry. Co. v. Smith, 13 S. W. Rep., 562.

<sup>17</sup> Filbert v. Delaware & H. Canal Co., 23 N. E. Rep., 1104.

<sup>18</sup> Johnson v. St. P. & D. R. Co., 45 N. W. Rep., 562.

<sup>19</sup> Daniels v. Union Pac. Ry. Co., 23 Pac. Rep., 762.

<sup>20</sup> Galveston, H. & S. A. Ry. Co. v. Smith, 13 S. W. Rep., 562.

<sup>21</sup> Lagrone v. Mobile & O. R. Co., South. Rep., 432.

<sup>22</sup> Int. & G. N. R. Co. v. Dyer, 13 S. W. Rep., 377.

<sup>23</sup> Daily v. R. & D. R. Co., 11 S. E. Rep., 320.

<sup>24</sup> Daily v. R. & D. R. Co., 11 S. E. Rep., 320.

<sup>25</sup> Donnelly v. B. & M. R. Co., 24 N. E. Rep., 38.



## MEETINGS AND ANNOUNCEMENTS.

## Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Boston & Lowell*, 3½ per cent., payable Jan. 1.  
*Boston, Revere Beach & Lynn*, 7 per cent., payable Jan. 1.  
*Canadian Pacific*, 2½ per cent., payable in February (1½ per cent., government guarantee).  
*Chicago Junction Railway and Union Stock Yards C.*, semi-annual, 3 per cent. on the preferred stock and quarterly 2½ per cent. on the common stock, payable Jan. 5.  
*Connecticut River*, quarterly, 2 per cent., payable Jan. 1.  
*Delaware & Hudson Canal Co.*, quarterly, 1½ per cent., payable Dec. 16.  
*Fitchburg*, \$2 per share on the preferred stock, payable Jan. 15.  
*Manhattan (Elevated)*, quarterly, 1½ per cent., payable Jan. 2.  
*Missouri Pacific*, quarterly, 1 per cent., payable Jan. 15.  
*New York & Harlem*, 4 per cent., payable Jan. 2.  
*Norfolk Central*, semi-annual, 4 per cent., payable Jan. 15.  
*Norwich & Worcester*, \$1 per share on the preferred stock, payable Jan. 3.  
*Oregon Railway & Navigation Co.*, quarterly, 1½ per cent., payable Jan. 1.  
*Panama*, 1½ per cent., payable Dec. 16.  
*Richmond, Fredericksburg & Potomac*, 3½ per cent., payable Jan. 2.  
*Richmond & West Point Terminal*, 2½ per cent. on the preferred stock, payable Jan. 15.  
*Tennessee Coal, Iron & Railroad Co.*, semi-annual, 4 per cent., payable Jan. 15.  
*Tyrole & Clearfield*, 2½ per cent., payable Dec. 30.

## Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Addison & Pennsylvania*, annual, Addison, N. Y., Jan. 12.  
*Albemarle & Pantego*, annual, Norfolk, Va., Jan. 20.  
*Boston & Lowell*, annual, Boston, Mass., Jan. 7.  
*Buffalo, Thousand Islands & Portland*, annual, 96 Broadway, New York City, Dec. 29.  
*Central of Georgia*, annual, Savannah, Ga., Dec. 23.  
*Cleveland & Pittsburgh*, annual, Cleveland, O., Jan. 7.  
*Columbus, Hocking Valley & Toledo*, annual, Columbus, O., Jan. 13.  
*Kings County (Elevated)*, annual, Brooklyn, N. Y., Jan. 14.  
*Lehigh Valley*, annual, Philadelphia, Pa., Jan. 20.  
*Little Schuylkill*, annual, 410 Walnut street, Philadelphia, Pa., Jan. 14.  
*Mine Hill & Schuylkill Haven*, annual, 119 South Fourth street, Philadelphia, Pa., Jan. 12.  
*Nesquehoning Valley*, annual, 226 South Third street, Philadelphia, Pa., Jan. 12.  
*New York, Ontario & Western*, annual, 18 Exchange place, New York City, Jan. 21.  
*North Pennsylvania*, annual, Philadelphia, Pa., Jan. 12.  
*Norwich & Worcester*, annual, Worcester, Mass., Jan. 14.  
*Ottawa Colonization*, annual, Montreal, P. Que., Jan. 6.  
*Philadelphia & Reading*, annual, Philadelphia, Pa., Jan. 12.  
*Philadelphia, Wilmington & Baltimore*, annual, Wilmington, Del., Jan. 12.  
*Pittsburgh & Lake Erie*, annual, 77 Fourth avenue, Pittsburgh, Pa., Jan. 27.  
*Pittsburgh, McKeesport & Youghiogheny*, annual, Pittsburgh, Pa., Jan. 20.  
*Rome, Watertown & Ogdensburg*, annual, 96 Broadway, New York City, Dec. 29.  
*Pontiac Pacific Junction*, annual, Montreal, P. Que., Jan. 14.  
*St. Louis, Vandalia & Terre Haute*, annual, Greenville, Ill., Jan. 13.  
*Terre Haute & Indianapolis*, annual, Terre Haute, Ind., Jan. 5.  
*Terre Haute & Logansport*, annual, Terre Haute, Ind., Jan. 5.  
*Toledo & Ohio Central Extension*, annual, Marietta, O., Jan. 12.  
*Western & Atlantic*, annual, Atlanta, Ga., Jan. 21.  
*Western New York & Pennsylvania*, annual, 242 South Third street, Philadelphia, Pa., Jan. 12.

## Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

*The Southern & Southwestern Railway Club* will hold its next meeting in Atlanta, Ga., Jan. 15.  
*The New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.  
*The Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.  
*The New York Railroad Club* meets at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in each month.  
*The Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.  
*The Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station at 7:30 p. m.  
*The Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union station, except in the months of July and August.  
*The American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.  
*The Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.  
*The Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.  
*The Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.  
*The Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club

stands adjourned during the months of July, August and September.

*The Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

*The Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

*The Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

*The Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

*The Engineering Association of the Southwest* generally holds its meetings at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

*The Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

*The Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

*The Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

*The Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p. m.

*The American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

## The Civil Engineers' Club of Cleveland.

A regular meeting was held Tuesday evening, Dec. 9, Vice-President Gobeille in the chair, and 20 members and three visitors present.

Prof. Harry F. Reid, Boswell C. Miller, Arthur Skeels and Messrs. David Owen and Boswell H. St. John were elected active members. Mr. King, of Norwalk, O., was invited to address the Club. He explained some of the methods used, and the discoveries he had made, in pure mathematics. The address was followed by a discussion of "The Injurious Effects of Cement on Lime Mortar," which was opened by Mr. C. O. Arey and participated in by Messrs. Richardson, Eismann and Hermann. They had noticed in buildings that lime mortar, to which cement had been added, was weaker and not as hard as that in which no cement had been used. Mr. Thompson had noticed that cement mortar had failed to produce a bond between limestones when the same mortar would form an excellent bond with sandstones. Mr. Morse had seen buildings taken down where first rate results were shown with the cement lime mortar. The present practice among Cleveland architects appears to be to use clear cement mortar, or clear lime mortar, except in freezing weather, when a little lime is added to cement mortar to prevent freezing before setting.

Prof. C. L. Saunders then read an interesting paper on "Transmission of Power by Belt and Rope," giving an account of the recent improvements of the various substitutes that are used instead of leather belts, the means taken to prevent slip, some of which are more than worthless, to diminish friction, and never increase their efficiency nor reduce the expense. This was followed by a discussion by Messrs. Mordecai, Roberts, Barber, Swasey, Eismann, Bowler, Benjamin and Hermann. Mr. Swasey mentioned a patent coupling which seems to be very efficient and for turning angles an excellent substitute for a twisted belt, but thinks that the day of the leather belt is by no means past. Mr. Benjamin stated that a crossed belt has but 90 per cent. of the efficiency of a straight one, with ¼ turn only 80 per cent. and with ½ turn and a guide pulley less than 80 per cent. Messrs. Eismann and Bowler mentioned cases where ropes had been discarded and belts substituted on account of expense. Mr. Hermann thought this was caused by a defect in design or workmanship. Mr. Roberts thought that with slow moving belts the atmosphere had but little to do with slip and resistance, but since the advent of the dynamo and a belt speed of over 6,000 ft. per minute this requires more study. Perforated belts appear to have done good service and boring holes through the pulleys seems to have been of great advantage. Mr. Benjamin stated that a belt with a velocity of over 6,000 ft. per minute requires the most careful balancing in all its parts to increase efficiency and prevent injury from its great centrifugal force.

## Engineers' Club of Cincinnati.

At the November meeting of the Club 20 members and several visitors were present. One application for membership was received and three new members were elected: Messrs. H. C. Innes, H. E. Warrington and Percy Jones.

The paper for the evening, by Mr. John W. Hill, under the title of "Some Remarks upon Water and Sewerage Works from a Sanitary Standpoint," treated at some length the important subjects of proper and sufficient water supply, drainage, and sewerage and garbage disposal.

## Northwest Railroad Club.

A meeting of the Club was held on Tuesday evening, Dec. 16, at 7:30 p. m., in the Directors' room of the St. Paul Union Depot. The subjects for discussion were: Rigid vs. Swing Beam Trucks; and the Best Plan of Washing Out and Caring for Boilers and Preparing Them for Service.

## Master Car Builders' Association.

The Secretary announces that the Executive Committee has decided to hold the annual convention at Cape May, N. J., commencing on Tuesday, June 9, 1891, at 10 a. m. Headquarters will be at the Stockton Hotel, which has made a uniform rate of \$3 per day. Messrs. Blackall, Lentz and Kells have been appointed a committee on headquarters. The committee found it impracticable to secure suitable hotel accommodations in New York.

## New England Railroad Club.

The subject for discussion at the next meeting, which will be held in the United States Hotel, Boston, on Jan. 12, will be: What constitutes a defect in a vertical plane coupler sufficient to condemn it?

## National Association of General Baggage Agents.

The Tenth Annual Convention of the Association will be held at the St. Charles Hotel, New Orleans, Jan. 21, at 2 p. m. Members are requested to forward to the Secretary (J. E. Quick, Detroit) for file a full list of foreign unclaimed baggage on hand Jan. 1.

## PERSONAL.

—Mr. George W. Ogilvie, Superintendent of the Des Moines & Northwestern road, has resigned, and will retire from the position on Jan. 1.

—Mr. Thomas Whittemore, clerk of the Fitchburg Railroad Corporation for many years, and formerly a paymaster in the service of the company, died at his home in Boston last week of heart disease.

—Mr. James Crossen, senior member of the firm of James Crossen & Co., of Cobourg, Ont., the well known Canadian car builders, died last week from hemorrhage of the brain. He had been ill less than a week. Mr. Crossen was 64 years old.

—Mr. J. W. Ferguson, who has been connected with the New York, Lake Erie & Western for over 12 years, latterly as Assistant Engineer in New York City, has resigned to accept a position with the firm of Coffrode & Saylor, of Philadelphia, with office in New York City.

—Mr. C. A. Coombs, Managing Director of the Annapolis & Baltimore Short Line, has been appointed Superintendent of Transfer Steamers of the Baltimore & Eastern Shore road. These steamers run across the Chesapeake Bay, making connections with the two roads.

—Mr. M. S. Connors, General Superintendent of the Peoria & Peoria Union, has been appointed Superintendent of the Chicago & Eastern Illinois and Chicago & Indiana coal railroads, to take effect Jan. 1. He was formerly Division Superintendent on the Cincinnati, Hamilton & Dayton.

—Mr. D. H. Nichols, formerly general superintendent of the St. Louis & San Francisco, who recently became Superintendent of the Western Division of the New York & New England, has been appointed to be General Superintendent, a position which was abolished when Mr. A. A. Jackson resigned.

—Mr. I. W. Fowler, formerly General Manager of the Charleston, Sumter & Northern, has been appointed General Superintendent of the Central New England & Western, to succeed Mr. S. B. Oddyke, Jr. Mr. C. L. Martin, Auditor of the Charleston, Sumter & Northern, has been appointed Acting General Manager to succeed Mr. Fowler. Both Mr. Fowler and Mr. Martin were formerly in the freight department of the Rome, Watertown & Ogdensburg road.

—Mr. Thomas Tait, the Superintendent of the Canadian Pacific at Toronto, has been presented with a handsome testimonial on the occasion of his marriage. The gift was a beautiful sterling silver salver and a tea set, chased by hand. The salver bears the following inscription: "Presented to Thomas Tait, General Superintendent Ontario and Atlantic divisions, Canadian Pacific Railway, by the officers and employees, on the occasion of his marriage, Dec. 10, 1890."

## ELECTIONS AND APPOINTMENTS.

*Adirondack & St. Lawrence*.—The incorporators of this New York road are: Morton S. Parmalee, Charles W. Reid, Clark J. Lawrence, Frederick D. Kilburn, Martin E. McClary, Robert C. Thompson, Nelson W. Porter, Clinton Stevens, Scott G. Boyce, Marshall E. Howard, William C. Stevens, Malone, N. Y.; Edson J. Chamberlain, St. Albans, Vt., and James N. Aubrey, Constable, N. Y.

*Aransas Pass*.—The incorporators of the company are: J. T. Simpson, of Dallas, Tex.; J. H. Allen, of St. Louis, Mo., and J. R. Hoxie, of Ft. Worth, Tex., and others.

*Atchison, Topeka & Santa Fe*.—O. H. Brown, who for some time has been Assistant General Freight Agent at Topeka, Kan., has been appointed General Live Stock Agent, vice Hon. J. W. Hamilton, resigned, to take effect Jan. 1.

*Atlantic & Danville*.—At the recent annual meeting the following directors were elected: C. J. Goodheart, J. E. T. Ryder, J. L. Rice, R. C. Marshall, Charles H. Cromwell, R. M. Stuart Wortley, J. Libby.

*Baltimore & Ohio*.—At the regular meeting of the directors of the company, Dec. 17, Charles F. Mayer was unanimously re-elected President of the company for the ensuing year.

*Buffalo & Southwestern*.—At the annual meeting at Buffalo, N. Y., last week, the following directors were elected: W. S. Bissell, James Adam, E. G. Spaulding, Jewett M. Richmond, W. H. H. Newman, Daniel E. Bailey, Thomas Hodgson, Daniel O'Day, Henry M. Watson, Samuel Spaulding, E. R. Spaulding, Richmond Kingman, and William H. Barnes. The only change in the board was the election of E. R. Spaulding in place of Andrew Langdon.

*Chicago, Danville & Ohio River*.—The first board of directors of this Illinois company are: George W. Cole, C. Porter Johnson, Consider H. Willett, Leo D. Mayer, Richard A. Allen, Charles A. Carr, Roy O. West, W. C. Collins and John W. Slack.

*Chicago & Evansville*.—The following are the incorporators: Charles L. Jewett, G. C. Cannon, New Albany, Ind.; J. C. Fawcett and F. H. Allison, Louisville; Alexander A. Arthur, Middlesborough, Ky.; N. Hoskins and F. Schneider, Jasper, Ind.

*Cincinnati, New Orleans & Texas Pacific*.—D. Miller has been appointed Traffic Manager of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern. His office is at Cincinnati, O.

*Cleveland, Cincinnati, Chicago & St. Louis*.—E. T. McConnell has been appointed Engineer of Maintenance of Way of the Peoria division. The name was incorrectly printed last week as W. A. McConnell.

*Dunderrburg Spiral*.—The shareholders met in the office of the company at 1 Union Square, this week, and re-elected the old Board of Directors and the President, James Morgan, and Secretary, D. L. Prouditt.

*Fidalgo City & Anacortes*.—The officers are as follows: President, Joshua Pierce, Tacoma, Wash.; Secretary, C. B. Holman, Seattle, Wash.; Treasurer, J. S. Potter, Fidalgo City, Wash.; Manager Land Department, C. B. Colver, Seattle, and Chief Engineer, D. P. Sanderson, Fidalgo City.

*Fredericksburg & Valley*.—At a meeting at Orange, C. H., Va., the company was organized by the election of the following officers and directors: President, W. L. White, of Fredericksburg, Va.; Vice-President, Robert S. Walker, Secretary and Treasurer, T. McCracken, Directors: M. B. Rowe, of Fredericksburg; Charles Payne and Chancellor Bailey, of Spotsylvania; John T. Payne and C. C. Buckner, Orange; G. B. Nolle and Dr.



James Scott, of Culpeper, and William J. Cave and Dr. William A. Bickers, of Madison.

**Georgetown & Granger.**—The officers are: Emzy Taylor, President, Georgetown, Tex.; J. M. Denson, Vice-President, Granger, Tex.; and A. O'Neil, Locating Engineer, Ballinger, Tex.

**Georgia, Carolina & Northern.**—The division general offices of the Seaboard Air Line for the above division, including the Auditor's office, have been removed from Greenwood, S. C., to Abbeville, S. C.

**Goderich & Wingham.**—A meeting of the shareholders of this road was held last week at which five directors were appointed. Dr. Holmes was elected President, Judge Toms, Vice-President, and Dudley Holmes was appointed Secretary and Treasurer of the company.

**Great Northern.**—W. B. Green, formerly Superintendent of the Montana Central, has been appointed Assistant Superintendent of the Montana Division of this company, with headquarters at Havre, Mont.

**Hartford & Connecticut Western.**—The annual meeting of the stockholders of the road was held in Hartford, Conn., Dec. 16. The board was elected as follows: John S. Wilson, John W. Brock, W. W. Gibbs, Charlamagne Tower, Jr., Arthur E. Newbold, Arthur Brock, William B. Scott, Henry Gay, Jeffrey O. Phelps, J. H. Appleton, H. A. Botsford, Frederick Miles, and E. N. Spurr.

**Housatonic.**—At the annual meeting of the stockholders of the Housatonic, held in Bridgeport, Conn., Dec. 16, the following Board of Directors was elected: William H. Starbuck, J. L. Macauley, Henry Hentz, and Thomas Rutter, New York; William H. Stevenson, Bridgeport, Conn.; William E. Downes, S. E. Merwin, New Haven; Ph. C. Lounsbury, Ridgefield; A. B. Myratt, New Milford, Conn. The following officers were elected: President, William H. Starbuck; Vice-President and General Manager, William H. Stevenson; Secretary and Treasurer, M. E. Stone; Assistant Secretary, A. J. Porter; Assistant Treasurer, C. E. Robinson.

**Jacksonville, Tampa & Key West.**—R. B. Cable has been appointed General Manager, with office at Jacksonville, Fla. He succeeds D. F. Jack, who resigned last July. W. B. Coffin has been appointed Superintendent of the road. He was formerly with the New York, Lake Erie & Western as Division Superintendent, with headquarters at Hornellsville, N. Y.

**Louisville & Nashville.**—Frank Harris has been appointed Master of Trains of the Knoxville Division of the road, vice W. G. Sala, resigned.

**Maine Central.**—The annual meeting of the road was held in Portland, Me., Dec. 17, and the following directors were elected: Arthur Sewall, of Bath, President; Payson Tucker, Portland, Vice-President; Amos Paul, South Newmarket; Asa P. Potter, Boston; William G. Davis, Portland; Frank Jones, Portsmouth; Samuel C. Lawrence, Medford, Mass.; John Ware, Waterville, Me.; H. N. Jose, Portland; William A. French, Boston; J. S. Ricker, Deering; Thomas W. Hyde, Bath; Charles A. Sinclair, Portsmouth; Josiah H. Drummond, of Portland, was elected clerk.

**Mobile & Western.**—The incorporators of the Alabama division are: A. Nesbit Turnbull, of Baltimore, Md.; Elmore Christman, of Minneapolis, Minn.; John H. Turner, of Mobile, Ala., and others.

**Neversink Valley.**—Richard T. Leaf has been elected President of this road, vice George F. Baer, resigned.

**New Haven & Derby.**—At the annual meeting of the stockholders of the road, held in Bridgeport, Conn., the following directors were elected: Thomas Wallace, Franklin Farrel, Ansonia, Conn.; William Stevenson, Bridgeport; N. D. Sperry and S. E. Merwin, New Haven; John L. Macauley, Henry Hentz, E. V. Cary and M. E. Stone, New York. The election of officers for the year was postponed.

**New York & New England.**—The office of General Superintendent, recently abolished, has been recreated, and D. H. Nichols, Superintendent of the Western Division, has been promoted to that position, with office at Boston.

**Norfolk & Western.**—At a recent meeting of the directors of the road Joseph H. Sands was appointed Vice-President, in charge of the transportation department, to take effect Jan. 1. He will also continue to act as General Manager. The following appointments by the President under the revised organization were confirmed, to take effect Jan. 1: David W. Flicker, General Superintendent Eastern Division, Roanoke, Va.; A. C. Hippey, General Superintendent Western Division, Roanoke; O. Howard Royer, Assistant General Freight Agent, Roanoke; E. T. Burnett, Assistant Purchasing Agent, Roanoke; G. R. W. Armes, Assistant Treasurer, Philadelphia; Walter Macdowell, Assistant Auditor, Roanoke.

The Shenandoah Valley road has been acquired by this company and will hereafter be known as the Maryland & Washington Division of the Norfolk & Western. The jurisdiction of the heads of departments of the latter road has been extended over the latter division. The Maryland & Washington Division will be operated in two sub-divisions. That portion of the line between Roanoke and Shenandoah will be operated as the Roanoke Division and that portion between Shenandoah and Hagerstown will be operated as the Shenandoah Division.

**Northern Central.**—Frank W. Parsons has been appointed Freight Agent of this company, at Rochester, N. Y., and will solicit freight business for the company at Rochester and Charlotte, at points on the New York Central and West Shore roads between Rochester and Syracuse, and at points on the Rome, Watertown & Ogdensburg. His office is at No. 13 East Main street (Wilder Building), Rochester, N. Y.

**Omaha, Kansas Central & Galveston.**—The officers of the company are: Jacob Newberger, President, 111 Broadway, New York; C. M. Rawlings, Vice-President, Lyons, Kan.; D. M. Bell, Treasurer, Lyons; Valdemar Sillo, Secretary, 330 East 51st street, New York; and Edward Roemer, Chief Engineer, 177 East 93d street, New York.

**Orange County.**—The board of directors of this company at a meeting held recently, appointed the following officers: Grinnell Burt, General Manager, Warwick, N. Y.; John Sayer, Secretary and Treasurer, in place of George S. Jones, resigned.

**Oregon Improvement Co.**—C. J. Smith, has been appointed General Manager of all the property and interests of the company in the possession and charge of the receiver, with authority to manage and conduct said business and appoint all subordinate officers. His headquarters will be at Portland. John L. Howard has been

appointed Manager in California, with headquarters at San Francisco. S. B. Willey has been appointed Auditor, with headquarters at Portland, Or. J. L. Howard is the present Manager of the San Francisco office. S. D. Willey is the Multnomah County Treasurer, and was formerly Controller of the Oregon Railway & Navigation Co.

**Parsons & Southeastern.**—The directors of this new Kansas company are: William Bond, W. H. Woolverton, New York City; R. L. Steven, Attica, N. Y.; H. D. Merrick, Washington, D. C.; W. Martindale, Emporia, Kan.; C. H. Kimball and Lee Clark, Parsons, Kan.

**Pennsylvania.**—J. B. Hutchinson, Superintendent of the Western Pennsylvania division, with headquarters at Allegheny City, Pa., has been appointed Superintendent of the Maryland division of the Philadelphia, Wilmington, vice H. H. Carter, who resigned, to retire from the railroad business. James Reed, Superintendent of the Schuylkill division, with headquarters at Reading, Pa., will be Superintendent of the West Pennsylvania division, with headquarters at Allegheny City. W. Hayward Myers, Superintendent of the Belvidere division, will succeed Mr. Reed at Reading. Wilson Brown, Superintendent of the Frederick division, will go to the Belvidere division as Superintendent, and G. W. Creighton, at present Assistant Engineer of the Philadelphia division, will become Superintendent of the Frederick division. These changes will take effect Jan. 1.

C. M. Mendenhall has been appointed Assistant Master Mechanic of the Meadows Shops, vice Mr. Oscar Antz, resigned.

**Richmond & Danville.**—The following directors were elected last week: Samuel Thomas, Calvin S. Brice, John G. Moore, John C. Calhoun, John A. Rutherford, C. N. McGee, John M. Hall, John S. Barbour, Samuel M. Inman, George J. Gould, James B. Pace and W. G. Oakman.

**St. Louis & San Francisco.**—At a meeting of the Board of Directors of this company, held Nov. 21, George C. Magoun was elected Chairman of the Board, and H. W. Gardiner, Secretary and Treasurer.

**Ulster & Delaware.**—At a meeting of the Board of Directors of the company, held at Rondout, N. Y., this week, the following officers were elected: Edwin Young, Albany, President; Robert C. Pruyn, Albany, Vice-President; Samuel G. Dimmick, Kingston, Secretary; Thomas C. Hoornbeck, Rondout, Treasurer; Edwin Young, Robert C. Pruyn and J. D. Layng, Trustees.

**Union Pacific.**—S. H. H. Clark has been appointed Vice-President and General Manager of the system, vice William H. Holcomb, appointed Assistant General Manager, with headquarters at Omaha, Neb.

**Victoria, Port Crescent & Chehalis.**—This road is a branch of the Northern Pacific. The directors and officers are as follows: T. F. Oakes, Paul Schulze, Jas. Hunter, T. Lubbe, C. F. Clapp, J. E. Lutz, Walter Oakes, H. S. Huson and J. M. Ashton. Officers: President, Paul Schulze; Vice-President, T. Lubbe; Secretary, E. N. Costello, and General Agent, J. E. Lutz. The office is at Tacoma, Wash.

**Wheeling & Lake Erie.**—Downer Adams has been appointed auditor of the company, vice S. H. Ayres, deceased.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Adirondack & St. Lawrence.**—This company filed articles of incorporation in New York last week to build an extension of the St. Lawrence & Adirondack. The proposed line is to commence at a point on the International line between the United States and the Dominion of Canada, in the town of Constable or Burke, in the County of Franklin, N. Y., which is the southern terminus of the St. Lawrence & Adirondack road, and extend thence by the most direct route to the village of Malone and continue in a southerly direction through or into the counties of Franklin, Hamilton, Essex, Warren, Fulton, Saratoga, Montgomery and Schenectady, terminating at the city of Schenectady. The length of the road is to be 200 miles.

**Akron & Chicago Junction.**—The track has been laid for 15 miles, and the grading has been completed for 50 miles more. The road is being built with 20-ft. grades and two per cent. curves. There are six iron bridges between 100 ft. and 60 ft. long. The route is from Akron in Summit County, O., through the counties of Summit, Wayne, Medina, Ashland, and Huron, to Chicago Junction, Huron County, passing through the towns from Akron, New Portage, Clinton, Warwick, Rittman, Sterling, Creston, Lodi, Homer, Sullivan, Nova, Herford, Greenwich, and Stotts, to Chicago Junction, about 69 miles altogether.

**Anderson & Southport.**—The bill to incorporate this company has passed the South Carolina legislature. The road is to extend from Anderson through Abbeville, Newberry, Fairfield, Kershaw, Darlington, Laurens, Florence, Marion and Horry to the North Carolina line in the direction of South Port, N. C.

**Atkokan Iron Range.**—Engineer Russell has gone west to locate this road from a connection with the Canadian Pacific to the Atkokan River. The new line will be about 50 miles in length, and it is expected that the location can be finished in six weeks. There is a very feasible route known to exist via the Fire, Steel and Seine rivers.

**Atlanta & Birmingham.**—The bill incorporating this railroad has been passed by the Alabama Legislature. An amendment provides that the franchises granted should not be transferred or disposed of until 20 miles of the road shall be built.

**Atlantic Coast Line.**—A bill has been introduced in the Georgia legislature extending the charter privileges of the Augusta & Manchester road in Georgia. This is the branch of the Atlantic Coast Line from Sumter to Augusta, and is the road by which the proposed extension to Augusta will be built.

**Beeville, Lagarto & Rio Grande.**—This road is projected to extend from Beeville south to Lagarto, Live Oak County, Tex., a distance of about 12 miles, and also through San Diego and toward the Rio Grande River. About \$45,000 has already been subscribed in the two towns. H. B. Newberry, of Lagarto, is one of the projectors.

**British North American.**—Application will be made to the Dominion Parliament at its next session for an act to incorporate this company, with power to con-

struct a road from Winnipeg to the Saskatchewan River and to extend to Hudson's Bay, and with power to acquire the line of the Winnipeg & Hudson's Bay Railroad.

**Buffalo & Geneva.**—Fisher & Chilson, who had the contract for 22 miles of the road adjoining Dowling & Kennedy's contract, running from the western part of Batavia to Cheektowaga, N. Y., have been succeeded by Bendlinger & Nearing. In April last, when the contracts were let, the firm of Fisher & Chilson, of Harrisburg, were given sections 71 to 93, but it is stated that no contract was signed, and that the company is liable for the indebtedness of the firm.

**Burlington & Missouri River.**—The work on the extension from Edgemont to Custer, S. D., has been stopped, but that on the line from Deadwood south is still going on, and the line will probably connect with that ending at Custer very soon.

**Canadian Pacific.**—This company is soon to make extensive repairs and improvements on the old South-eastern line between Farnham and Newport, Vt., part of the main line to Boston. Wooden bridges are to be replaced by iron and steel and the roadbed thoroughly overhauled. One of the principal improvements will be the straightening of the line wherever possible, and the elimination of a number of curves between Cowansville and the Province line. The line from Farnham to Newport is now 65 miles long, but it is expected it will be materially shortened.

Grading has been completed for over 10 miles on the Mission branch, which leaves the main line at a point 43 miles from Vancouver, and runs south to the boundary line, to connect with the Seattle, Lake Shore & Eastern. Tracklaying is now in progress.

**Chattanooga Southern.**—The grading on the road is practically complete from Chattanooga south to Gadsden, Ala. The line will be finished to Gadsden in a short time, except the tunnel, which is over half done. The track between Chattanooga and Kensington has been ballasted. The line will be built on south from Gadsden without delay to Leeds.

**Chesapeake & Ohio.**—During the present year the company will have constructed 23 miles of new second track on the Huntington division. In addition to this there has been built a branch from Stone City, Ky., a distance of nine miles to stone quarries, and a branch from Hawk's Nest to the Anstead coal mines, a distance of four miles. A coal branch from Coalburg to a point on Cabin Creek, a distance of about 15 miles, is now about completed. The construction of the Craig Valley branch, which is about 26 miles in length, is progressing favorably. The grading is finished and the work of laying track was commenced this week.

The proposed branch from Covington through the Warm Springs Valley has not yet been definitely determined upon.

**Chicago & Eastern Illinois.**—A party of engineers have been engaged for some time in making a survey for a proposed extension from near Terre Haute, Ind., southeast to Louisville, Ky. The engineers have finished the survey for about 60 miles to Bedford, Ind., and they are now engaged on the line through Lawrence, Monroe and Washington counties. It is expected that the survey will be finished to Louisville in the latter part of February.

**Chicago & Evansville.**—The articles of incorporation were filed in Indiana last week. The capital stock is \$1,200,000. The proposed road is to be 80 miles in length, and is to extend from Evansville to French Lick Springs, through the counties of Vanderburg, Warrick, Pike, Dubois and Orange.

**Chicago, Rock Island & Pacific.**—The second track between Annawan and Geneseo, Ill., a distance of 13 miles, was completed recently and is now being operated. The laying of the second track on this section completed the second track from Chicago to Rock Island, Ill., a distance of 181 miles.

**Colorado Midland.**—Work at the Busk-Ivanhoe tunnel is progressing favorably. The Busk end is now in 400 ft. and the Ivanhoe 250 ft. The latter has a much larger open cut for the approach than the other. At present both sides are progressing at the rate of 15 ft. per day. The electric plant and air compressors are all in place. About 400 men in all are employed.

**Columbia, Newberry & Laurens.**—On the extension from Newberry northwest to Clinton, S. C., 22 miles, the grading has been mostly completed, and tracklaying has been begun, and is being laid between Newberry and Jalapa, S. C., 7 miles.

**Delaware, Susquehanna & Lehigh.**—Brown Brothers & Co., contractors of Susquehanna County have been awarded the contract for the construction of the new coal road, which is to traverse the Lehigh coal field. The contract is for 10 miles of the road from a point near the Mr. Pleasant colliery, at Hazleton, to Oneida, Schuylkill County. The contracts call for the completion of the work by next July, 1891. Hon. Eckley B. Cox, of Drifton, is President of the company.

**Drayton, Linden & Spokane.**—E. T. Johnson, of J. H. Smith & Co., contractors of Portland, Or., is preparing estimates and bids for the construction of the first 15 miles of this road from Drayton to the town of Linden, Or. This road will run through the thickly settled Nook-sack valley and will reach coal fields in Washington.

**Fidalgo City & Anacortes.**—This road has been recently completed from Fidalgo City, on Deception Pass, north of Whidbey Island, northerly across the Northern Pacific, to Anacortes, Wash., on Ship Harbor. It is about 11 miles long. Austin Lathrop, of Anacortes, was the contractor. The most important structure on the line is a pile trestle one mile long. There are several framed trestles. Electric equipment will be furnished by the Thomson-Houston Co. for passenger service only; freight will be handled by steam locomotives. The work has been very light. Maximum grades for steam and electricity are 6 per cent., and for electricity alone 10 per cent. The maximum curves for steam and electricity are 191 ft. radius, and for electricity alone 50 ft. radius. The road is expected to handle a large local business as well as to carry freight and passengers across the 11 mile portage from boats at Fidalgo City to boats at Anacortes, thus saving small boats the trip through "open water" in the straits of San de Fuca. D. P. Anderson, of Fidalgo City, Wash., is Chief Engineer.

**Fort Payne & Eastern.**—Maj. W. F. Carley, Chief Engineer of the road, has a corps of surveyors in the field staking out the right of way for the extension of that line from its present terminus at Coal Mine on Lookout Mountain to Augusta, Ga. Coal Mine is about



10 miles south of Chattanooga, on the mountain top. The surveyors are divided into three divisions. The first division is on the route of Coal Mine to Summerville, via Menlo; the second division from Summerville to Gainesville, and the third from Gainesville to Augusta. Three surveys are being made, and work will begin as soon as the right of way is decided on. A survey of the western branch of the same line from Fort Payne to Stevenson, on the Nashville, Chattanooga & St. Louis, has been completed.

**Gauley & Ten Mile.**—Work on the road up Gauley River in Kanawha County, W. Va., has been stopped by an injunction granted by the Circuit Court of that county on the application of the Kanawha & Michigan Railroad.

**Georgetown & Granger.**—J. O'Neil, of Ballinger, Tex., has just completed a preliminary survey of this road from Granger, on the Missouri, Kansas & Texas, westerly to Georgetown, a distance of about 15 miles. The location will probably be made very soon, and it is expected that the company will be able to let the contract for grading when that has been done. The route just surveyed will have a maximum grade of 68 ft. per mile, and maximum curves of two degrees. There will be one 200-ft. steelspan bridge.

**Georgia Legislature.**—Bills have passed the legislature incorporating the following companies: Brunswick & Northern, North Augusta, Atlanta, Americus & Florida, to build a line from Atlanta via Talbotton and Americus, into Florida to Tampa; Washington & Midleton; Richlands, Gulf & Northern and the Atlanta & Northwestern; also to change the name of the Winnsboro & Fishdam.

**Grand Trunk.**—The contract for the second track from Sydney to Port Hope, Ont., has been awarded to Messrs. Quinlan & Doherty, New Hampshire.

**Great Northern.**—The company opened for traffic on Dec. 7 over 80 miles of its Pacific extension in Montana. Tracklaying is progressing at the rate of two miles a day, and it is expected that the Rocky Mountains will be reached by Christmas. Two thousand men are at work. Supplies are being concentrated in the Flathead Valley, west of the mountains, where a force of several thousand men will be employed and the line pushed to its terminus on Puget Sound. The locating survey has been made for about 500 miles of the extension. It begins at Pacific Junction, a new town between Havre and Assiniboine, Mont., and four miles west of the former town. The route strikes across the rivers and valleys, instead of following them, as is usually done in railroad construction. The most important points on the located line are: Marias Pass, Flathead River, Flathead Valley, Fisher River, Kootenai River, Bonners Ferry, Pend d'Oreille River, Diamond Lake and Little Spokane River. Nearly 150 miles of this distance is reported graded. The road is being built with one per cent. maximum grades and three degree curves. A wooden trestle, 140 ft. high and 1,200 ft. long, will be built.

Surveys are still in progress on the Belt Mountain line from Monarch, Mont., for proposed branches to Barker and Niehart. These lines will open up a rich mineral region tributary to the silver and copper smelters at Great Falls, Mont.

**Indianapolis, Decatur & Quincy.**—At a meeting of the stockholders of the Indianapolis, Decatur & Western in Indianapolis Dec. 12 the name was formally changed to the above. The new company was incorporated in Illinois last September, but various complications connected with the receivership have postponed the reorganization of the road. It is proposed to begin next spring the extension from Decatur to Beardstown, Ill., about 80 miles. The surveys for this line were made nearly two years ago and practically all the right of way has been secured.

**International.**—This company is applying to the Dominion Parliament for a charter for a road from a point on the forty-ninth parallel of north latitude where the Kootenay River flows north into British Columbia, northerly along the valley of that river and of Kootenay Lake, westerly through the Lardo Pass, thence northerly along the valleys of the Columbia and Canoe rivers to the Tete Jaune Cache, the Fraser River to its northerly bend, to Lake Frances, and thence along the valley of the Pelly or Yukon River to the eastern boundary of Alaska.

**Lancaster, Oxford & Southern.**—The locating survey for the various extensions of this road have been completed and the construction work will begin as soon as the contract has been let. The present narrow gauge line from Lancaster south to Quarryville, Pa., 15 miles, will be widened to standard gauge, and a new road will be built to White Rock on the narrow gauge Oxford & Peach Bottom, eight miles, and also from Oxford southeasterly to Singery, Md., on the Philadelphia extension of the Baltimore & Ohio, a distance of 14 miles. The narrow gauge line between White Rock and Oxford, nine miles, will also be changed. A branch is projected from Oxford to Landenberg, on the Baltimore & Philadelphia, a distance of 14 miles. This last line has not been definitely decided upon.

**Louisville & Nashville.**—The company is pushing to completion its extension from Cumberland Gap east to Norton, Va., about 70 miles, to connect with the Norfolk & Western system, and it is expected to be completed and the connection made by March 1.

**Mobile & Western.**—This company and the Mobile & Western Construction Co., which were organized to succeed the Mobile, Jackson & Kansas City, have applied to the Alabama Legislature for special charters.

**Monterey & Mexican Gulf.**—The track on this road has been completed this year for about 235 miles, from a point near Montemorelos to a point about 90 miles beyond Victoria, Mex. This leaves only 84 miles to complete the line to the Southern terminus at Tampico, on the Gulf of Mexico.

**Nashville, Chattanooga & St. Louis.**—A bill was recently introduced in the Alabama State Legislature granting authority to this company to build through various counties in North Alabama, from a point on the Huntsville division southeast to Guntersville, on the Tennessee River. The Tennessee & Coosa road, which is controlled by this company, has a charter to build over the road, and is now being extended from Atalla and Guntersville. The proposed amendment to the company's own charter would be of advantage in facilitating the accomplishment of certain legal matters. It was objected to the bill that it did not name definitely the point where the proposed connection with the

Huntsville division would be made, and the representatives of Huntsville could not secure the assent of the company to have the connection begin at that point. Their influence was strong enough to defeat the bill when it came up for passage.

A survey has been recently begun by a party of engineers of this company for a proposed extension from Tullahoma to Lynchburg, Tenn., a distance of about 20 miles. The survey will be made to determine whether or not the plan is practicable. The Pikeville extension now in course of construction is completed for 18 miles out from Dunlap or within two miles of Pikeville, Tenn. It will be finished by the first of the year.

**New Roads.**—The several towns located in the valley of the Rio Grande between Corpus Christi and Eagle Pass, Tex., have united in a movement to build a railroad connecting the two towns. The citizens of Eagle Pass have already raised \$5,000 by subscription, which sum will be used in making the survey of the proposed line. The work of securing the right of way and subsidies from property holders along its course is now in progress.

**New York, Ontario & Western.**—The work of constructing a tunnel through the mountain range between Sidney and Walton, N. Y., is nearing completion. In addition to the work upon the long open approaches at either end, more than 1,200 of the 1,578 ft. of the tunnel proper have been excavated. The cutting is now progressing through solid rock, and steam drills are kept at work night and day in both headings. The respective headings will probably meet at the centre of the mountain by Jan. 1, and the tunnel will be ready for traffic next spring. The advantages gained by the company by the construction of the tunnel will be the reduction of the maximum grade at that point from 104 to 75 ft., and the shortening of the company's main line of road between Sidney and Walton about two miles. The total cost of the improvement is estimated at about \$600,000.

**Northern Pacific.**—The Seattle Belt or Lake Washington Belt, at Seattle, Wash., as it is variously called, is now about completed. It is really a branch of the Northern Pacific & Puget Sound Shore road, diverging from that line at Black River Junction and skirting the eastern shore of Lake Washington to a connection with the Seattle, Lake Shore & Eastern, near Gilman Junction. The distance is 22 miles and the entire line will probably be ready for operation in a few days. The grading is about completed with the exception of a few places where injunction suits have not yet been adjusted. At Black River Junction considerable tracklaying has been accomplished and a large amount of material is now in hand. Work on the Seattle, Lake Shore & Eastern which comes in from the north is also being pushed.

The grading is now about completed on the entire line of the Tacoma, Olympia & Gray's Harbor road. About 65 miles of track has been laid. It extends from Centralia to Ocosta, Wash., with a branch from Harlow Junction extending through Olympia to a connection with the Northern Pacific at Lake View, one of the suburbs of Tacoma. The total length of this line is 106 miles.

On the Pullman & Lewiston branch via Moscow, Idaho, tracklaying machines are putting down the track at the rate of two miles daily. Eight miles have been laid in Washington and about 20 miles in Idaho from Moscow south toward Lewiston, Idaho.

Tracklaying on the Chehalis and South Bend branch is in progress from Chehalis, Wash., west.

**Northern Transcontinental.**—This company is applying to the Dominion Parliament for power to construct a road from Prince Albert on the North Saskatchewan River, westerly to Lake Athabasca, thence northerly and westerly along the Great Slave Lake and River to and along the valleys of the Mackenzie, the Riviere aux Liards, the Dease River and Lake, and the Tanziila and Stikine Rivers to the easterly boundary of Alaska.

**Ogden & Hot Springs.**—This road is now in operation from the city limits of Ogden through North Ogden and Pleasant View to Hot Springs, Utah, a distance of about seven miles. The work was commenced early in the summer, but delay in receipt of the material for construction purposes has caused several postponements in opening the road. It follows the country road for the entire distance with the exception of one mile. The road is built with a maximum grade of three per cent., and curves of 14 degrees. There is a 12-ft. span bridge, which is trussed with longitudinal rods and wooden cords. An extension from Hot Springs north for about 11 miles is projected, but no survey has been made.

**Old Colony.**—The extension of the Wrentham Branch, 4½ miles through the town of Walpole, Mass., is under contract, and the grading and bridging is being pushed along with quite a large force. The stations on the line are Walpole and East Walpole. The grading and masonry is being done by McCarty Bros. of Franklin, Mass. The line between North Attleboro and Walpole, a distance of 13 miles, has been completed and was recently placed in operation. The work on the Wrentham extension is quite heavy; maximum grades are one per cent., and maximum curves three degrees. There are five iron bridges, all over highways, from 30 to 50 ft. long. The road is being built for a single track. The second track of the Dedham Branch between Readville and Dedham, Mass., 2¼ miles, is nearly graded, and the track is partly laid.

**Omaha, Kansas Central & Galveston.**—The survey will begin within a month at Lyons, Kan., for this road, and some few miles from that point may be built in the spring. The projected route through Kansas is from Superior, Neb., thence south through Jewell, Mitchell, Lincoln, Ellsworth, Rice, Reno, Kingman and Harper counties. The company is incorporated to build from Omaha to Galveston.

**Parsons & Southeastern.**—A charter was obtained in Kansas last week for the company, with headquarters at Parsons, Kan., to build a road from Parsons southeast to the Missouri River, through the counties of Labette, Crawford and Cherokee, and the states of Missouri and Arkansas; length of line is estimated at 450 miles. The capital stock is \$9,000,000.

**Pittsburgh, Canonsburg & State Line.**—The County Commissioners of Ohio County, W. Va., which includes the city of Wheeling, have denied the petition of the projectors of this road that a special election be called to vote on a proposition to subscribe 100,000 of county bonds to the capital stock of the company. The road is to be built from Wheeling via Canonsburg to Pittsburgh and Connellsville, Pa. The Commissioners wanted the company to guarantee that coke would be

laid down in Wheeling upon the same basis as that now enjoyed by Pittsburgh manufacturers.

**Pittsburgh, Cincinnati, Chicago & St. Louis.**—An extension of the New Cumberland branch of the Pittsburgh division was begun this week from New Cumberland, W. Va., up the Ohio River, to Rocky Side. About 400 laborers are engaged on the work.

**Port Arthur, Duluth & Winnipeg.**—The track is now out nearly opposite Silver Mountain, and trains are busy ballasting. Tracklaying will be completed on the first 50 miles in a few days. The officers of the road are said to have assurances from the Duluth & Iron Range road that it will begin work next spring on an extension of that road from Ely to the boundary line.

**Rio Grande Western.**—The Sevier Valley extension is now beyond Spring City, and will reach Manti Jan. 1. The track will remain there until spring, when a further extension south down the Sevier Valley will begin.

**St. Louis & Eastern.**—The first 12 miles of this road has been placed in operation from Venice, near the eastern terminus of the approach to the St. Louis Merchants Terminal Bridge, northeasterly to coal mines east of Peters, Ill., on the Toledo, St. Louis & Kansas City road. An easterly extension of the road for about 41 miles is now being surveyed.

**Seattle, Lake Shore & Eastern.**—The trains on the Northern branch are now running beyond Arlington to Sedro, Wash., where connections are made with the Fairhaven & Southern and Seattle & Northern for Anacortes, Fairhaven and other points on Puget Sound. The track has been laid beyond Sedro, but it is probable that passenger service will not be extended north of that point until the line has been connected with the branch of the Canadian Pacific being built south from Mission, B. C. The grading has been entirely completed, and the bridging and tracklaying alone remains uncompleted.

About 150 men are at work laying track and bridging and are now a number of miles north of Sedro. When the south fork of the Nooksack River was reached the work was discontinued for about a week, as a large 200-ft. span had to be swung in position. Tracklaying has been resumed and will be pushed rapidly until completed.

**Seattle & Montana.**—Bridge building on the road is progressing rapidly. The large draw across the Snohomish will soon be completed, and the portion across Eby's Slough, in a few weeks. The first span for the section across Eby's Slough will be running in two weeks, and the other in a couple of weeks later. One of the spans for the Skagit River bridge has already been placed in position. Around Smith's Cove the piling is progressing slowly and will undoubtedly be completed in a couple of months.

**South Carolina Legislature.**—Bills have been introduced in the legislature to incorporate the Waterboro Summerville & Olanito, Western Carolina, Batesburg & Western, and South Carolina & Seaboard & Western railroads.

**Spokane & Palouse.**—The following maps and profiles of the road have been filed in the office of the Secretary of State of Washington: Finally located line from near Moscow, through Latah County to the north boundary line of the Nez Perce Indian reservation located line, commencing near the west boundary and extending to Asotin and Lake Waha via Lewiston; profile showing line from state line to Genesee, Idaho; profile of line through Latah County from state line via Moscow and Julietta to Potlatch; profile of finally located line of the Spokane Falls & Idaho road from Houser Junction to Coeur d'Alene City; profile of line from Old Mission to St. Regis Pass.

**Union Pacific.**—The executive committee, at a meeting held in New York this week, decided to suspend for the present all construction work on the Portland & Puget Sound road, which is being built from Portland to Tacoma and Seattle, Wash., a distance of 185 miles.

**Utica & Prospect.**—The work of surveying the route for the proposed road from Prospect to Utica, N. Y., has been completed by G. C. Ward, of Boonville, N. Y., the surveyor in charge. He has experienced but little difficulty on the line save at the Trenton Falls hill; but a feasible line was finally discovered around it. Outside of this the grades are very easy to overcome.

**Vancouver, Northern & Alaska.**—Application is being made to the legislature of British Columbia for an act incorporating a company to construct a road from some point on the south side of Burrard Inlet, near Vancouver, on the Fraser River, via Seymour Creek Valley, the Pemberton meadows, the Chilcoten Plains and the head waters of the Fraser River to a point on the Parsnip or Peace rivers, with branches in a northerly direction to the Skeena and Stickeen rivers to the boundary of Alaska.

**Victoria, Port Crescent & Chehalis.**—This line has been organized by officers of the Northern Pacific, and it will be built as a branch of that road. The line will start from one of the towns on Gray's Harbor, extending thence in a northerly direction to Port Crescent on the straits of Fuca, and will be about 125 miles in length. About 12 miles from Port Crescent, south, are now in process of construction. Surveys will be completed next year, when it is expected contracts for further construction work will be let.

**Washington & Western.**—The commissioners of the District of Columbia have given a hearing on the survey of the proposed extension of this road to Washington. The route as provided in the Senate bill is from the Virginia side of the Potomac River, at the present terminus of the road, crossing by bridge and following an easterly direction and by way of Water street in Georgetown to Rock Creek, and thence along Virginia avenue and 26th or 27th streets west, then southwardly to the intersection of said streets with the line of B (Water) street north, and thence east with, along or adjacent to the line of B (Water) street and through reservation 4 (old observatory grounds) to the terminus of said extension near 17th street west.

**Waterloo Junction.**—Ground has been broken for this road, which is being built as a branch of the Grand Trunk from Waterloo north to Elmira, Ont., 10 miles. The work will be under the charge of J. C. Boyd, of Simcoe, Ont., E. Faye, of Toronto, has sub-contracted for the grading. E. H. Chapman, of Toronto, is the engineer in charge of the work. The line of 10 miles has to be completed within a year from this date. There will be a large iron bridge and a heavy fill where the line crosses the Cor estogo River.



**Weatherford, Mineral Wells & Northwestern.**—The contractors, Laing & Smoot, of Dallas, Tex., have all the grading completed between Weatherford and Mineral Wells, Tex., 22 miles. The track has been laid from Weatherford to within 13 miles of the coal shafts at Mineral Wells. Part of the equipment has been received and trains will begin running Jan. 1.

**Wheeling Bridge & Terminal.**—The connection between the Cleveland, Lorain & Wheeling Railroad and the terminal system of this company was made at Martin's Ferry, O., last week, and the first car passed over the connecting viaduct on Friday. The viaduct over the tracks of the Cleveland & Pittsburgh is 1,200 ft. long, built of steel by the Edgemore Bridge Works.

**Wheeling & Eastern.**—This company has been organized to build a road from Wheeling, where it will connect with the lines of the Wheeling Union Bridge and Terminal system, easterly to where it will reach the extensive coking coalfields of Connellsville, Pa. A tunnel about 2,900 ft. long will be built through the hills at Wheeling. A contract has been signed with Page, Carey & Co. for construction of the tunnel. F. W. Cram, of Bangor, Me., is the representative of the Eastern people interested in the enterprise. The company will soon be chartered and the incorporators will include several large manufacturers of Wheeling.

**Wheeling & Lake Erie.**—The progress of the road from Portland Station, O., where it strikes the Ohio River, to Wheeling, has been stopped at one point by an injunction. The company had made arrangements with the County Commissioners to use a part of the county road for a road bed, but the court holds that the commissioners have no authority to allow the road to be used for any other purpose than highway travel. The piece of road is in a very narrow place, where a precipitous river bank is on one side and the tracks of the Cleveland & Pittsburgh are on the other.

**Wisconsin Midland.**—Track is being laid through Fond du Lac, Wis., but as soon as that work is finished all work will be stopped until spring. It is doubtful if work will be resumed then and the entire project will probably be abandoned.

**Yaxima & Pacific Coast.**—Tracklaying on this branch of the Northern Pacific, extending from Chehalis to Willapa Harbor, Wash., has been commenced from the Chehalis end of the line, as it is not considered practical to take an engine and cars to Willapa on the Pacific. Eight miles of grade is finished on the Chehalis end of the line and about five miles on the Willapa end. A force is kept at work near Chehalis, but it is small. The grade on the Tacoma, Olympia Gray's Harbor line will be finished about Jan. 1, and the force employed there will be transferred to this line. Files are being driven across the Newaukum for the bridge.

#### GENERAL RAILROAD NEWS.

**Baltimore & Ohio.**—The following is the statement of earnings and expenses for November, 1890, compared with November, 1889 (November, 1890, approximated): Earnings, 1889, \$1,959,449; 1890, \$1,965,725; increase, \$6,276. Operating expenses, 1889, \$1,310,619; 1890, \$1,375,891; increase, \$65,272. Net earnings, 1889, \$648,830; 1890, \$589,834; decrease, \$58,996. Earnings and expenses for the two months of the fiscal year, 1890-91, compared with the same months of the previous fiscal year: Earnings, 1889, \$4,211,931; 1890, \$4,231,932; increase, \$20,001. Operating expenses, 1889, \$2,647,839; 1890, \$2,862,737; increase, \$214,901. Net earnings, 1889, \$1,564,095; 1890, \$1,369,195; decrease, \$194,900.

**Canada Eastern.**—A special meeting of the stockholders of this company will be held at Gibson, N. B., Dec. 22 to ratify the agreements relating to the acquisition and purchase of the Chatham road, and authorizing the issue of debenture bonds.

**Charleston, Cincinnati & Chicago.**—Capt. Samuel Lord, of Charleston, S. C., has been appointed temporary receiver of the road. The complainants are the Finance Company, of Pennsylvania; the Investment Company, of Philadelphia, and Barker Bros. & Co., of Philadelphia, and the complaint is against the railroad, the Massachusetts & Southern Construction Co., the Boston Safe Deposit & Trust Co., McDonald, Shea & Co., of Tennessee; P. P. Dickinson, of New York, and William Kenefick, of Missouri, contractors. The bonds involved are probably not less than \$7,000,000, secured by deed of trust and a corresponding amount of stock, and the complainants now hold the bonds in the following amounts: The Finance Co., of Pennsylvania, \$2,000,000; the Investment Co., of Philadelphia, \$1,000,000, and Barker Bros. & Co., \$253,000. The motion for the appointment of a permanent receiver will be argued at Charleston before the United States Court. The defendants are enjoined from taking any part in the actions brought in the state courts in Tennessee.

**Housatonic.**—The annual report shows that the surplus from operation for the fiscal year amounts to \$193,074; an increase over the year ending Sept. 30, 1889, of \$77,116, and an increase over the fiscal year ending Sept. 30, 1888, of \$116,000. The passenger earnings for the fiscal year ending Sept. 30, 1890, show an increase over last year of \$97,317, and freight earnings for the same period show an increase over last year of \$204,273.

**Houston & Texas Central.**—An order has been issued by Judge Pardee, of the United States Circuit Court at Galveston, Tex., ordering the property turned over to Frederic P. Olcott, of New York, who purchased the road for \$10,000,000 when it was sold under foreclosure last spring. The property went into the receiver's hands in 1885 upon a complaint filed in the United States Court by Nelson S. Easton and James Rintoul, trustees, and the Farmers' Loan & Trust Co.

**Louisville & Nashville.**—The company has about concluded the purchase of the Kentucky Central, paying for it in bonds now in the company's treasury. There will be no new bonds or stocks issued on account of the purchase. The company had been negotiating for this road about three years, but could not get it at a satisfactory price until now. The price is not stated, but is believed to be below par for the stock. The advantage of the line to the company is giving it a shorter cut by 93 miles into Cincinnati from Lexington, and points directly south. It also gives another entrance into Cincinnati at the Grand Union Depot. At present the Louisville & Nashville enters only in the eastern part of the city, where it connects with the Pennsylvania. The new entrance will connect it with all the other systems entering the city.

**Montreal & Atlantic.**—The Southeastern road, operated by the Canadian Pacific, is to undergo another nominal change of ownership. W. C. Van Horne, William Farwell and James T. Furber, trustees of the road, state that they will, at the next session of the Dominion Parliament, make application for an act to terminate their trust and to incorporate the Montreal & Atlantic, with power to acquire and operate the Southeastern.

**Rochester & Glen Haven.**—A mortgage for \$40,000 on the property of the company was filed in the County Clerk's office at Rochester, N. Y., recently. The mortgage is given to the Rochester Trust & Safe Deposit Co. as trustee for the bondholders to secure the payment of bonds to be issued by the company.

**Shenandoah Valley.**—The Norfolk & Western Railroad Co. announces that the reorganization of the Shenandoah Valley road has been completed, and that the road has passed under its control. It will hereafter be known as the Maryland & Washington division of the Norfolk & Western.

**Ulster & Delaware.**—The General Term of the New York State Supreme Court has affirmed the judgment in the case of the people against the railroad company, the action being to annul the charter of the company on the ground that it had failed to construct or operate any portion of its road between Stamford and Oneonta, N. Y., a distance of 26 miles. The company denied that it ever became bound or had any authority to construct its road between the points named. The judgment is in favor of the railroad company.

**Union Pacific.**—The audited October statement of the entire system shows gross earnings of \$4,436,021, a decrease of \$4,628; net earnings, \$1,498,676; decrease, \$499,909. For the 10 months ending Oct. 31, gross earnings were \$37,139,607; increase, \$3,764,529; net, \$12,209,698; decrease, \$683,893. In the ten months to Oct. 31 the Oregon Short Line & Utah Northern had net earnings of \$2,145,615, or 17 per cent. of the total net for the whole system; the Oregon Railway & Navigation Co. had \$698,239 net for the 10 months, or 5 1/2 per cent. of the total for the whole system, and the Union Pacific, Denver & Gulf had net of \$1,510,662, or 12.3 of the total net for the system. The annual interest charge of the Union Pacific, Denver & Gulf is \$1,444,430, of which \$181,300 is not payable until November, 1891, leaving net charges of \$1,263,130, so that in the 10 months the net earnings were \$247,532 in excess of full charges for the year. On the basis of estimated net earnings for November and December the same as October, they would be \$346,400, making \$593,932 over all charges for the year, including interest on its bonds held by the Union Pacific, so that the surplus for the year of the Union Pacific, Denver & Gulf would be equal to nearly 2 per cent. on the \$31,151,700 of its stock.

#### TRAFFIC.

##### Chicago Traffic Matters.

**CHICAGO, Dec. 17, 1890.**  
The Illinois Railroad and Warehouse Commission has ordered the adoption of rates upon live stock based upon actual weight in cents per 100 lbs., in place of the present rates per carload, effective Jan. 1. The Commissioners have also announced a readjustment of their classification of the railroads which transfers some of the lines into the higher class, thereby making them subject to the lower scale of maximum rates. The names of the roads transferred have not yet been made public. They have suspended their order establishing the uniform classification on Jan. 1, and will not enforce it until March 1.

If all reports are true, the members of the Western Passenger Association indulged in a most disgraceful proceeding at their last meeting. Charges having been made that one of the Chicago lines was a party to an arrangement whereby some tickets reading from Buffalo and Cincinnati, issued by an eastern line, had been placed in the hands of scalpers here, cutting the rate \$3 from Chicago to Kansas City, the Assistant Passenger Agent of the Chicago line called his associates liars, and charged the president of a leading Western line with having upheld scalping in order to keep his road out of the hands of a receiver. The other members then took a hand, and gave the aforesaid A. P. A. the lie back. Matters finally quieted down, and the hot-headed official apologized for his reflections upon the president in question.

It is announced that the Atchison has about completed arrangements for placing dining cars on the through route between the Missouri River and the Pacific.

The Iowa roads are in a quandary over the reduction in hog rates from the Missouri River to Chicago to 18 cents, to take effect Jan. 1. The Chicago, St. Paul & Kansas City insists upon making a rate on hogs five cents lower from St. Paul to Chicago than from Kansas City to Chicago. Consequently, if the rate is reduced to 18 cents from Kansas City, it will be reduced to 13 cents from St. Paul. The Chicago, St. Paul & Kansas City road runs through Iowa, and the result will be to drag down the rates to the 13-cent basis from competitive Iowa points.

The movement of eastbound carload freight through the lower Missouri River crossings for the month of November was as follows:

Line.	Cars.	Per cent.
Chicago & Alton.....	1,494	15.5
Burlington.....	1,455	15.1
St. Paul.....	530	5.5
Rock Island.....	695	7.2
Atchison.....	2,411	25.1
C., St. P. & K. C.....	405	4.2
Wabash.....	1,042	10.8
Mo. Pacific.....	978	10.2
K. C., F. S. & M.....	615	6.4
Total.....	100.0	

The total movement of tonnage through the same gateways for the same month was as follows:

LINE.	Westbound.		Eastbound.		Total.	
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.
C. & A.....	9,652	9.9	17,875	15.7	27,527	13.1
C. B. & Q.....	20,732	21.4	16,208	14.3	36,940	17.6
C. M. & St. P.....	5,039	5.2	5,620	5.	10,659	5.
C. R. I. & P.....	18,925	19.5	6,772	6.	25,697	12.2
C., St. P. & K. C.....	4,941	5.1	5,638	5.	10,579	5.
Wabash.....	10,104	10.4	14,298	12.6	24,402	11.6
Mo. Pacific.....	12,320	12.7	15,771	13.9	28,091	13.4
Atchison.....	15,279	15.8	31,345	27.5	46,624	22.1

The total movement through the Omaha-Council Bluffs gateway for the same month was as follows:

LINE.	Westbound.		Eastbound.		Total.	
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.
C. B. & Q.....	28,492	33.5	14,713	34.4	43,205	33.8
C. & N. W.....	17,129	20.1	10,885	25.5	28,014	21.9
C. M. & St. P.....	10,182	12.	6,560	15.4	16,742	13.1
C. R. I. & P.....	9,143	10.9	5,106	12.	14,249	11.1
C., St. P. & K. C.....	2,034	2.4	839	2.	2,873	2.3
Ill. Central.....	537	.6	.....	.....	537	.4
Mo. Pacific.....	11,357	13.3	2,259	5.3	13,616	10.7
Wabash.....	6,250	7.3	2,337	5.4	8,587	6.7

#### Traffic Notes.

It is said that all the roads interested have agreed to abolish commission payments on all eastbound passenger business from the Pacific coast.

The railroads in Kansas have agreed to transport free of charge all contributions to the destitute farmers in Western and Northwestern Kansas.

The National Board of Trade, at a meeting in New Orleans last week, adopted resolutions commending the National Transportation Association, and denouncing the uniform bill of lading.

Sharp competition between the Louisville, New Albany & Chicago, and the Chicago & Erie in bidding for a Knights of Pythias excursion, reduced the round trip fare between Chicago and Dayton, O., last week, to \$2.

Boston merchants who receive potatoes by rail from New Brunswick complain that the Boston & Maine will use no heated cars except those of the Eastman Company, thereby unjustly discriminating against the "frost proof" car.

The grain shippers of Manitoba complain because the Northern Pacific & Manitoba will not let its grain cars go east of Duluth and St. Paul, thereby necessitating a transfer with the accompanying expense. The Canadian Pacific runs cars through to the Atlantic seaboard.

The Delaware & New England Company, which was formed to control the lines south of Campbell Hall which work in connection with the Poughkeepsie Bridge route, announces that a traffic agreement has been made with the Baltimore & Ohio by which the controllable freight business of the latter road going to New England will be sent over the Poughkeepsie Bridge. It is given out that the number of cars over the Poughkeepsie Bridge in November was 2,500, counting those going in both directions, and this is stated to be five times as many as crossed in October.

The through passenger traffic over the lines of the Southern Pacific system for November was as follows:

	First class.	Second class.	Grand total.
Eastward.....	1,855	2,816	4,671
Westward.....	2,860	5,896	8,756
Total.....	4,715	8,712	13,427

In November, 1889, the westbound was 3,730 and the eastbound 4,328. The totals for the first eleven months of the year compare as follows:

	West.	East.
1888.....	99,970	69,989
1889.....	86,481	67,259
1890.....	74,942	58,095

The Fitchburg has met the reduction made by the Boston & Maine on second class passenger fares from Boston to Western points.

**Must Not Refuse to Switch Because of Unpaid Demurrage.**

The Illinois Railroad and Warehouse Commission has rendered a decision in the complaint of the Union Brewing Co., of Peoria, against the Chicago, Burlington & Quincy for refusal to switch cars. The respondent claims that it is not doing a general switching business, and cannot be held to do that service. The commission holds that the respondent is under legal obligation to switch cars for the complainant, because it performs that service for other patrons on the same tracks, and cannot discriminate against any of them. It appears that the complainant had previously refused to pay demurrage on two cars, and this question of demurrage was still in dispute. The Commission's do not undertake to decide whether this demurrage charge is legally collectable, but they hold that its non-payment cannot justify a refusal to switch cars for the complainants.

#### Texas Cattle.

The shipments of Texas cattle to Chicago for the season, May 1 to Nov. 30, amounted to 23,654 cars. The amount carried by the different lines was as follows:

	Cars.
Chicago & Alton.....	6,721
Wabash.....	4,887
Atchison, Topeka & Santa Fe.....	4,831
Chicago, Burlington & Quincy.....	3,685
Chicago, Milwaukee & St. Paul.....	1,288
Chicago, Rock Island & Pacific.....	1,142
Illinois Central.....	771
Chicago & Eastern Illinois.....	329
Total.....	23,654

#### Trunk Lines Matters—Advance of the Corn Rate.

The trunk line presidents at a meeting in New York, Dec. 18, voted to advance the rates on corn. When the general grain tariff was advanced early in November, no agreement could be reached for the raising of corn from the basis of 22 1/2 cents per 100 lbs. from Chicago to New York. Remaining at this figure, there was a constant complaint from the shippers of oats, who paid 25 cents. The presidents have now voted to increase the corn rate to 25 cents on Dec. 20. The approval of the Western lines is of course assured. The subject of reducing the mileage rates on all cars, whether private owners or those of connecting roads, was discussed, but action was postponed. Charges are made that some of the trunk lines are reducing rates by furnishing lighterage or other harbor facilities at New York at lower charges than those of other companies, and it was voted to have Commissioner Goddard make a thorough investigation of the matter, in order to lead to uniform charges in the harbor. The question of the payments of commissions on immigrant traffic by some of the Western roads was also left unsettled. On Wednesday the Trunk line executive committee discussed the proposed uniform classification, but indefinitely postponed its adoption.